

Dual 600A BDFB/BDCBB

Power :: 007-0001-260X

User Manual



Applies to: 007-0001-2600 :: 007-0001-2602 :: 007-0001-2602-TFD4 :: 007-0001-2602-TFD6 :: 007-0001-2602-4 :: 007-0001-2602-6

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Chapter 1: Dual 600A BDFB/BDCBB Description

1.1 Overview

Telect's Dual 600A Battery Distribution Fuse Board / Circuit Breaker Board (BDFB / BDCBB), model 007-0001-2600, contains two non-shared sets of input buses. Both sets of -48 VDC/RTN input buses are capable of 600A primary distribution feed to 18 circuit breaker output positions.

The open-frame architecture of the BDFB / BDCBB allows unrestricted top-down or bottom-up cabling of inputs and outputs.

The front panel contains 18 circuit breaker positions per feed for a total of 36 per panel. Each position accepts a standard "bullet terminal" circuit breaker or TFD holder rated up to 100A. VDC Power LED, Fuse Alarm LED, and input voltage test points on the standard removable alarm panel provide input/feed monitoring.

Note: Input current test points require an optional shunt and cabling. Optional removable alarm panels provide digital voltage and current meters. Contact telect.com for availability. [See the "Accessories" section on page 33.]

Telect's Dual 600A BDFB / BDCBB fits standard 19-in. or 23-in. racks set up for either EIA or WECO mounting. Up to four panels can be arranged in a bay to provide up to 2400A per feed (4800A per bay). (When installing four panels in a bay, a 23-in. bay is better than a 19-in. bay for reduced cable congestion.)



Figure 1 - Battery Distribution Fuse Board

1.1.1 Capabilities

1.1.1.1 Each Panel

- Dual feed
- 600A (Max., Continuous) per feed
- 800A (Max.) interrupt device per feed
- 18 outputs per feed; 36 outputs per panel

1.1.1.2 Full Bay of Four Panels

- Dual feed
- 2400A (Max., Continuous) per feed
- 3200A (Max.) interrupt device per feed
- 72 outputs per feed; 144 outputs per bay

1.1.2 Features

- Suitable for primary or secondary distribution
- Modular design expands capability of rack to as much as 4800A
- Open architecture provides easy input/output cabling
- Top-down or bottom-up cabling
- Standard "bullet terminal" circuit breakers (up to 100A per position)
- Optional TFD holders allow use of TPS or TLS fuses
- Alarm and battery (BATT) monitor overcurrent protection

1.1.2.1 TFD Models

- All positions pre-loaded with CSI TFD-101-011-05 holders
- Use TPS or TLS fuses for distribution/protection
- 400A or 600A shunts pre-installed for current measurement capability
- Digital alarm card for enhanced visual display
- Includes 19" rear cover for safety protection

1.1.2.2 007-0001-2602-X Models

- 400A or 600A shunts pre-installed for current measurement capability
- Digital alarm card for enhanced visual display
- Includes 19" rear cover for safety protection

Note: Current readings on the digital meter panel are specified to be accurate to 0.5mV at greater than 10 mV, or within 1% at levels greater than 20% of max shunt rating. Accuracy at the test points are 0.1 mV down to 1 mV.

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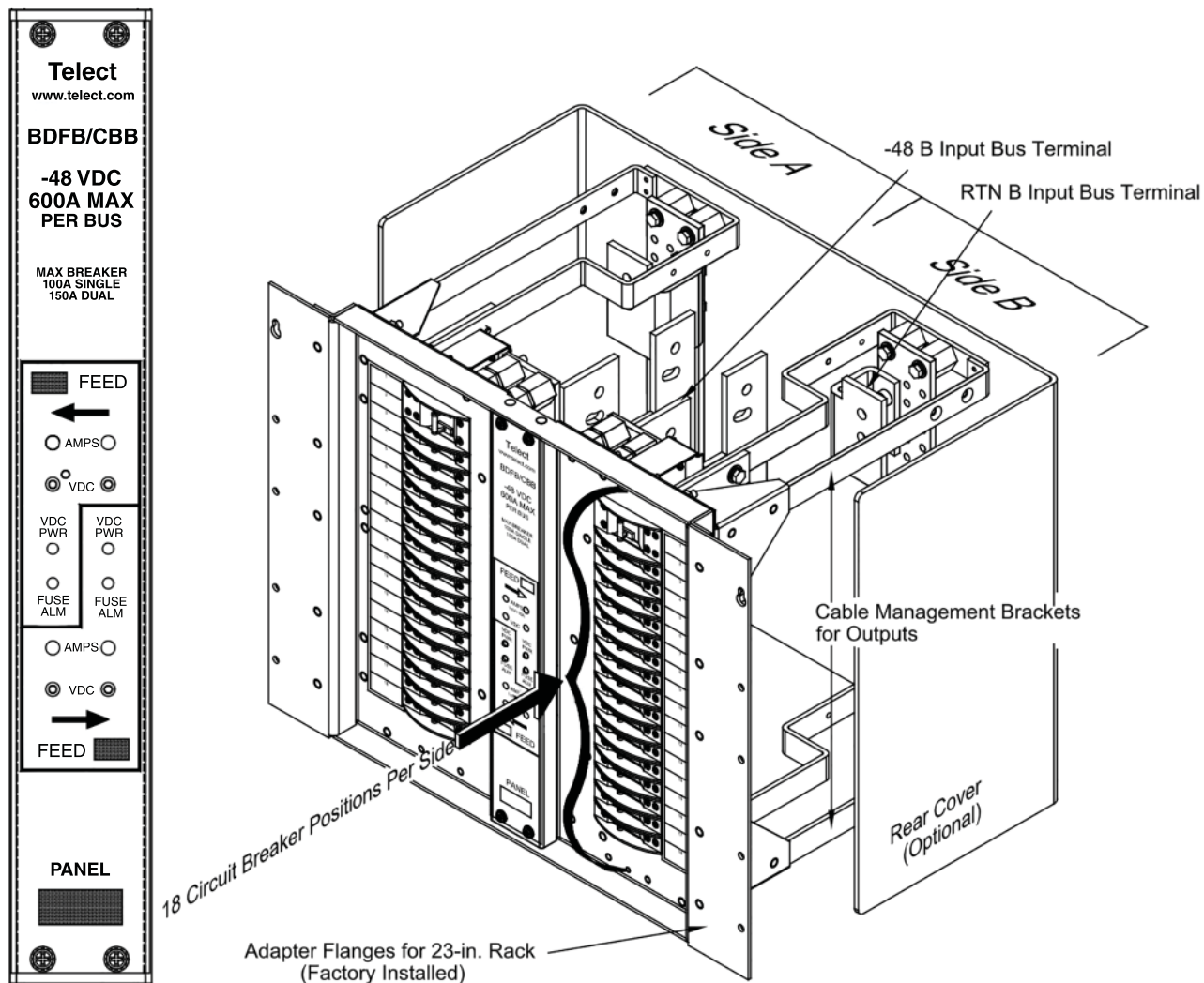


Figure 2 - Front

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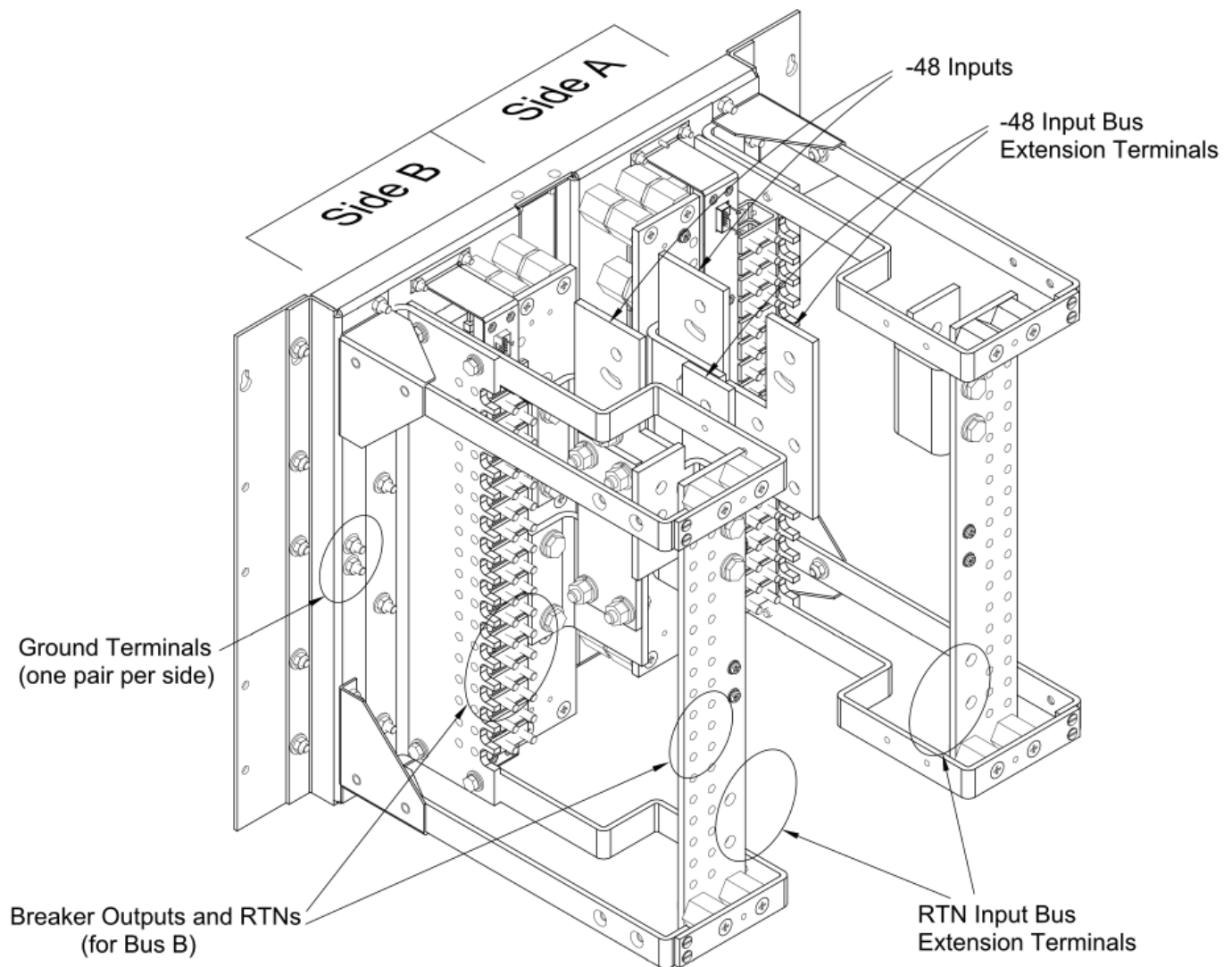


Figure 3 - Rear

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1.2 Specifications

Mechanical Interface	Specifications	
Ground Terminals	Quantity:	2 pair
	Stud size:	1/4-in.
	Cable size:	Up to #1/0 AWG (one per lug), depending on input interruption device
	Lug:	Dual-hole compression lug with 1/4-in. dia. holes (7 mm) on 3/4-in. (19 mm) centers ¹
	Lug fasteners:	1/4-20 KEPS nuts and flat washers
Input Terminal Bus Plate	Socket size for nut:	7/16-in. (12 mm)
	Maximum torque:	6 ft-lb (8.13 N•m)
	Number of plates:	Total 4: 1 BATT & 1 RTN per feed. Each terminal plate capable of supporting up to two, dual-hole input lugs (standard configuration) ²
	Hole size in plate:	.406-in. dia. (10 mm) on 1-in. (25.4 mm) centers
	Cable size:	One 750/777.7MCM (max.) per -48VDC or RTN lug. (Size of cable depends on size of input interruption device and plant voltage drop requirements)
	Lug:	Dual-hole compression for hole and cable size specified above ³
	Lug fasteners:	Grade 2, 3/8-16 bolts, nuts, lock washers, and flat washers
Output Breakers & Terminals	Socket size:	9/16-in. (14 mm) for bolt heads and nuts
	Maximum torque:	17 ft-lb (~23 N•m)
	Breaker terminals:	Total 36 (18 per feed), bullet-style
	Quantity:	One per single or double breaker
	Stud size:	1/4-in.
	Cable size:	For single-pole breakers, one, #2 AWG (max.) per lug For double-pole breakers, one, #1/0 AWG (max.) per lug ³
	Lugs:	Dual-hole compression with 1/4-in. dia. holes on 5/8-in. (19 mm) centers ²
	Lug fasteners:	1/4-20 KEPS nuts and flat washers
Output RTN Terminal Bus Plate	Socket size for nut:	7/16-in (12 mm)
	Maximum torque:	6 ft-lb (8.13 N•m)
	Number of plates:	One bus plate per feed accommodates 18 output RTN lugs
	Hole size in plates:	1/4-in. dia. (7 mm) on 5/8-in. (19 mm) centers
	Cable size:	For single-pole breakers, one #2 AWG (max.) per lug For double-pole breakers, one #1/0 AWG (max.) per lug ³
	Lugs:	Dual-hole compression for hole and cable size specified above ²
	Lug fasteners:	Grade 2, 1/4-20 bolts, KEPS nuts, and flat washers
Alarm Terminals, Standard	Socket size:	7/16-in. (12 mm) for bolt heads and nuts
	Maximum torque:	6 ft-lb (8.13 N•m)
	Wire size:	18-24 AWG
Input Test Points (each side) Standard Test Points Optional Test Points ⁴	Quantity:	6 contacts per side for NO or NC power and breaker (fuse) alarms
	Type:	Cage clamp (WAGO style)
	Wire size:	18-24 AWG
	For .080-in. test probes, where BLK is meter common and RED is meter volts:	VDC AMPS, where 1mV scale = 16A

¹ See Lug Chart on page 13 for approved manufacturers.

² Up to four dual-hole input lugs with the optional RTN external bus bar extension kit.

³ Double-pole breakers require an optional two-pole adapter.

⁴ Requires an optional shunt.

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Electrical Interface	Specifications
Operating voltages	-48 VDC nominal (-40 to -60 VDC range)
Maximum input interruption device	800A per feed
Maximum continuous input load	600A per feed per panel
Maximum output interruption device	100A per single-pole breaker 200A per double-pole breaker 125A per TFD holder
Maximum continuous output load	80A per single-pole breaker 160A per double-pole breaker 100A per TFD holder
Max. voltage drop	.25 VDC
Max. surface temperature of breakers at 26°C (79°F) ambient	37°C (99°F)
Max. panel heat dissipation at full load	225W/m ² per meter (20.9W/ft ² /ft)
Percentage of full load heat dissipation	Less than 0.5%
Alarm relay contacts	2A @ 30 VDC 0.6A @ 60 VDC
Max. alarm card power rating	@ 20V: 35 mA (0.70 W) @ 24V: 44 mA (1.06 W) @ 27V: 48 mA (1.30 W) @ 30V: 51 mA (1.53 W) @ 42V: 59 mA (2.48 W) @ 48V: 64 mA (3.07 W) @ 56V: 69 mA (3.86 W) @ 60V: 73 mA (4.38 W)
Physical/Environmental	Specifications
Shipping weight	~150 lb (~70 kg)
Weight without packaging or breakers	63 lb (29 kg)
Rack mounting	19" or 23" EIA/WECO (482.6 mm or 584.2 mm)
Operating temperature range	-5°C to 55°C (23°F to 131°F)
Storage temperature range	-40°C to 85°C (-40°F to 185°F)
Humidity	0-90%, non-condensing

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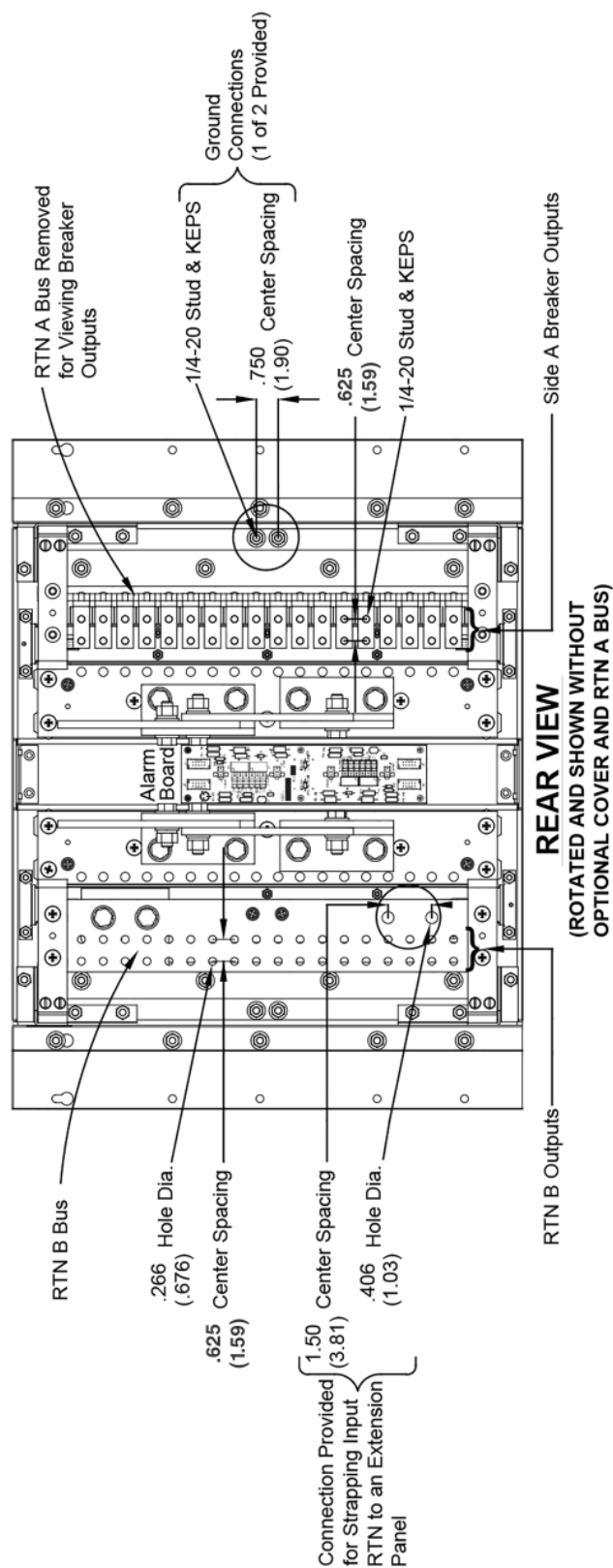
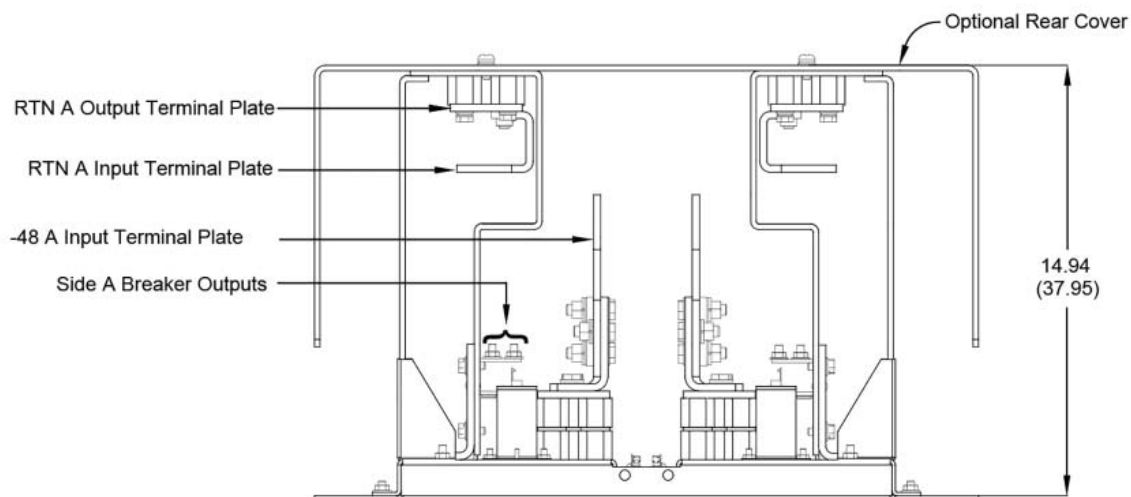


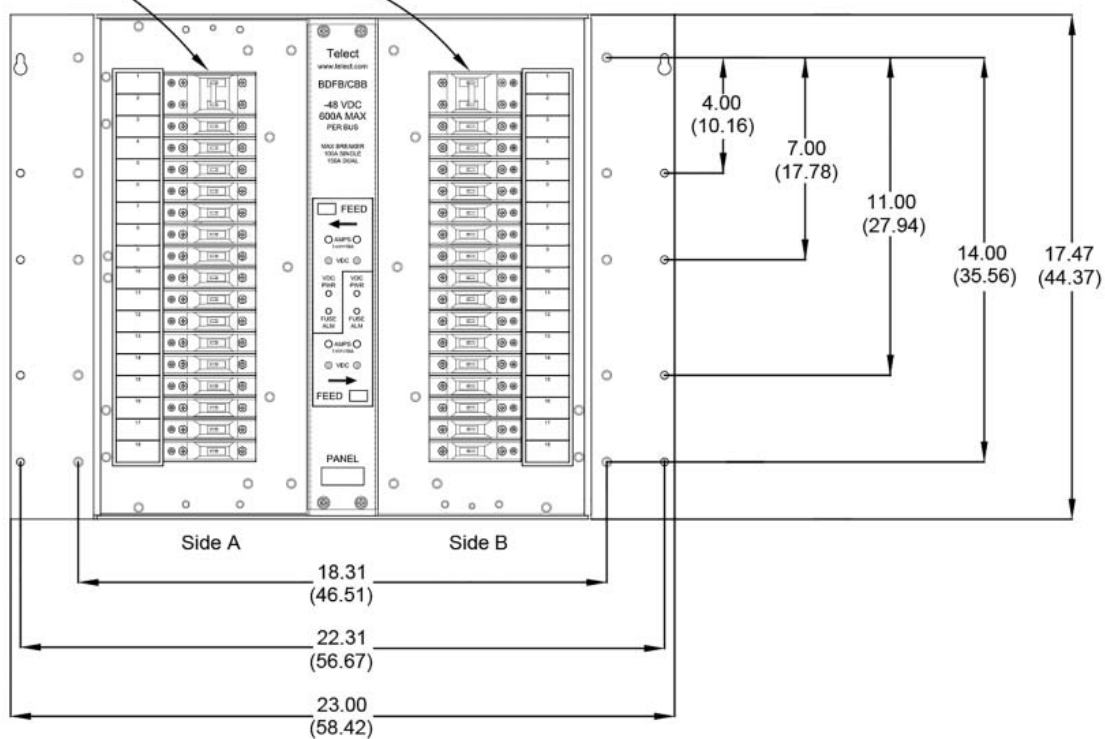
Figure 4 - Rear, Top, and Front Views

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TOP VIEW

Normal Breaker Layout is Shown Here.
(Panel is Shipped Without Breakers.)



FRONT VIEW

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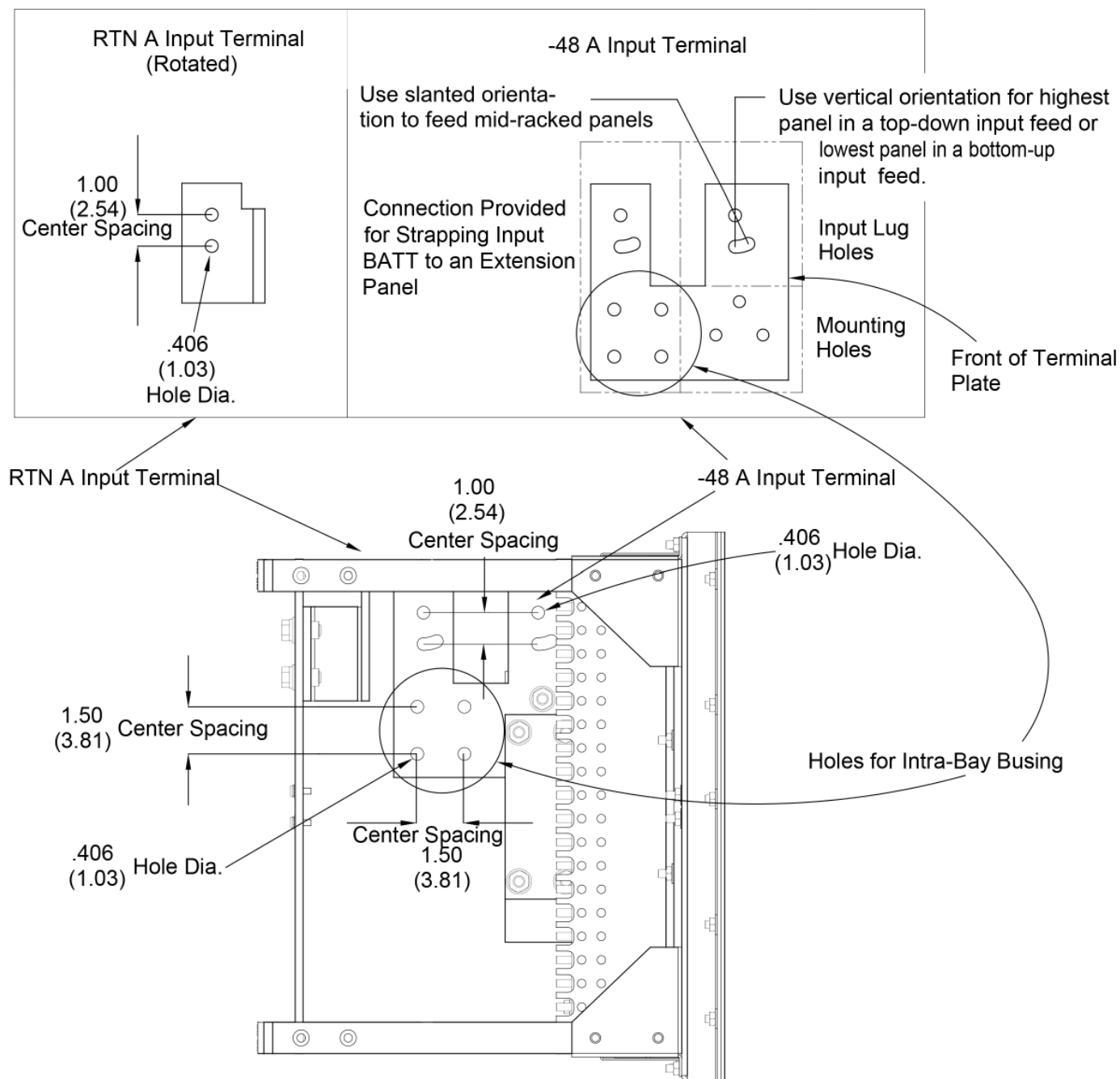


Figure 5 - Left Side View

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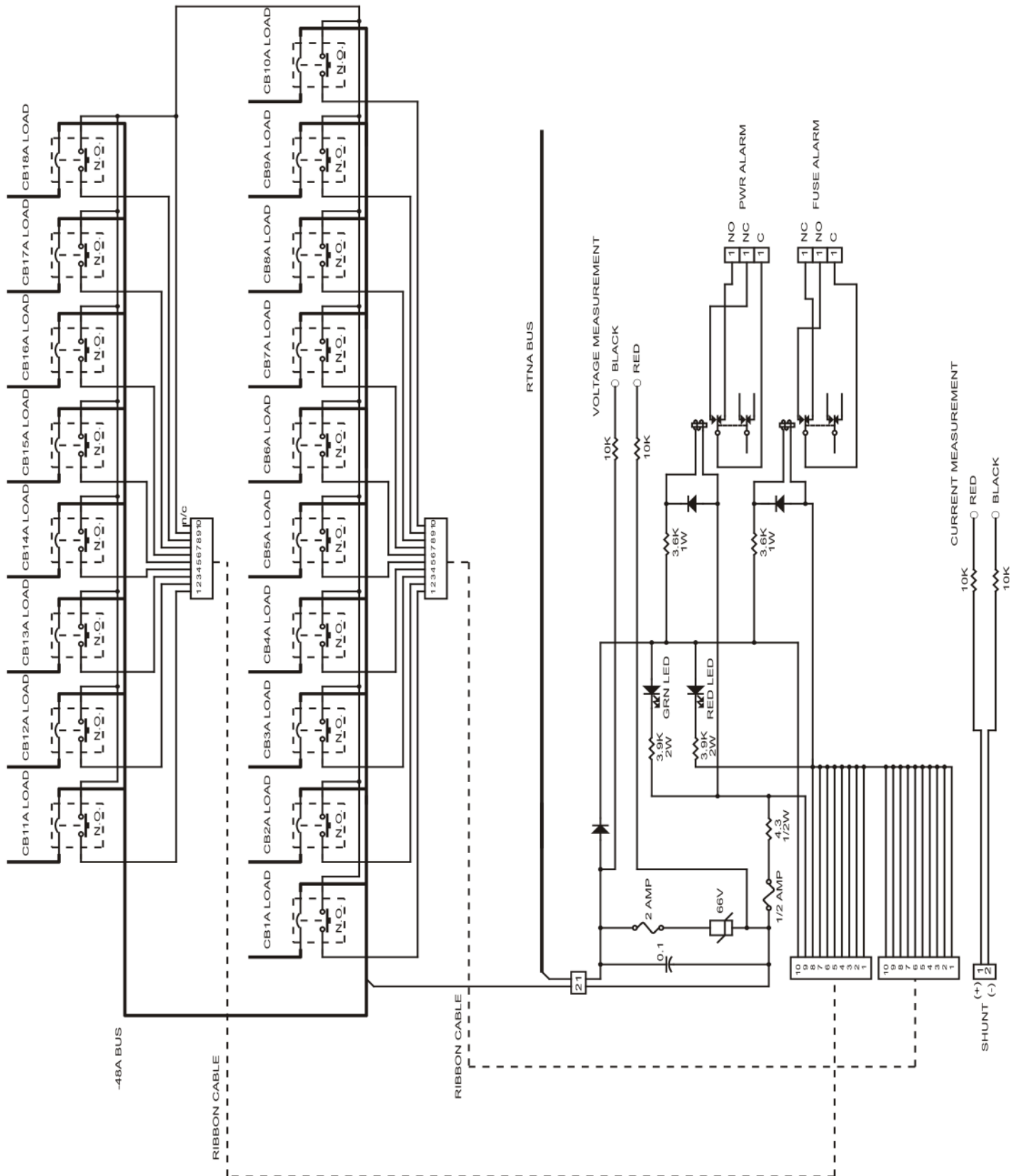


Figure 6 - Schematic 1

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Table 1 - Lug Chart

Rack Ground Terminals (for #1/0 AWG) ¹		
Flex Cable (266 Strand)	Burndy Panduit	YAV25L2TC14E2FX LCD2/0-14BX
Code Cable (19 Strand)	Burndy Panduit	YA25L2TC14E2 LCD1/0-14B-X
Input Terminals (for 750MCM, Nominal)		
Flex Cable (1850 Strand)	Burndy T&B	YA44L2NT38FX 58825NT
Code Cable (61 Strand)	Burndy	YA39L2TC38
Load & RTN Terminals		
#1 AWG	Burndy	YA1XL2NT14
#2 AWG	Burndy Panduit	YA2CL2NT14 LCDN2-14A-Q

¹ Grounding lugs included with the panel are 1 lug for 1/0 AWG and 1 lug for #1 AWG.

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Chapter 2: Installation

2.1 Installation Considerations

! ALERT

ALERT! Only qualified personnel may install and maintain this product. Verify that all connections meet requirements specified in local electric codes and your company guidelines before supplying power. Protect this equipment with a fuse or breaker sufficient to interrupt power levels specified in Chapter 1 of this manual.

2.1.1 Tools and Equipment

7/16-in. (or 12 mm) socket for 1/4-in. bolts and KEPS nuts
9/16 (or 14 mm) socket for 3/8-in. bolts and nuts
#2 Phillips screwdriver (screwdriver for cross-recessed screws)
Standard electrical cabling tools (cable lacing, crimping and stripping tools, cable cutters, etc.)

2.1.2 Bay Layout

In a standard bay, each BDFB / BDCBB requires 10 EIA rack positions (10 RU). Up to four BDFB / BDCBB panels can populate a bay having either 19-in. or 23-in. racks (either EIA or WECO spacing).

2.2 Inspection

Please read and understand all instructions before starting installation. If you have questions, contact Telect Technical Support at support@telect.com or call 1.509.926.6000.

When you receive the equipment, carefully unpack it and compare it to the packaging list. Please report any defective or missing parts to Telect Quality at quality@telect.com or call 1.509.926.6000.

Telect is not liable for transit damage. If the product is damaged, please report it to the carrier and contact Telect Quality.

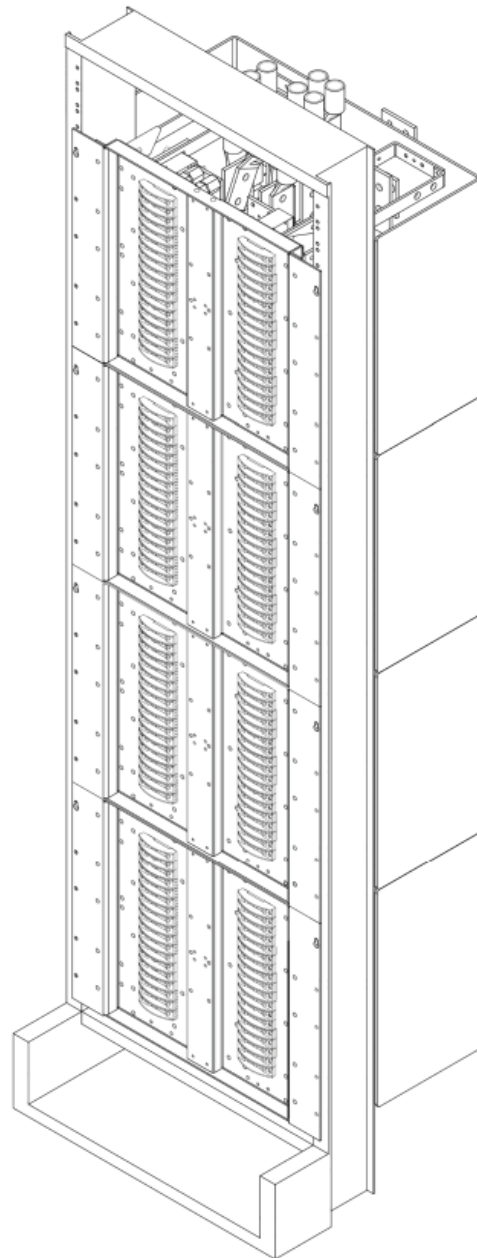


Figure 8 - Dual 600A Front Bay Corner

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2.3 Panel Installation

1. If applicable, remove the optional rear cover of panel (four 1/4-20 hex-head bolts).

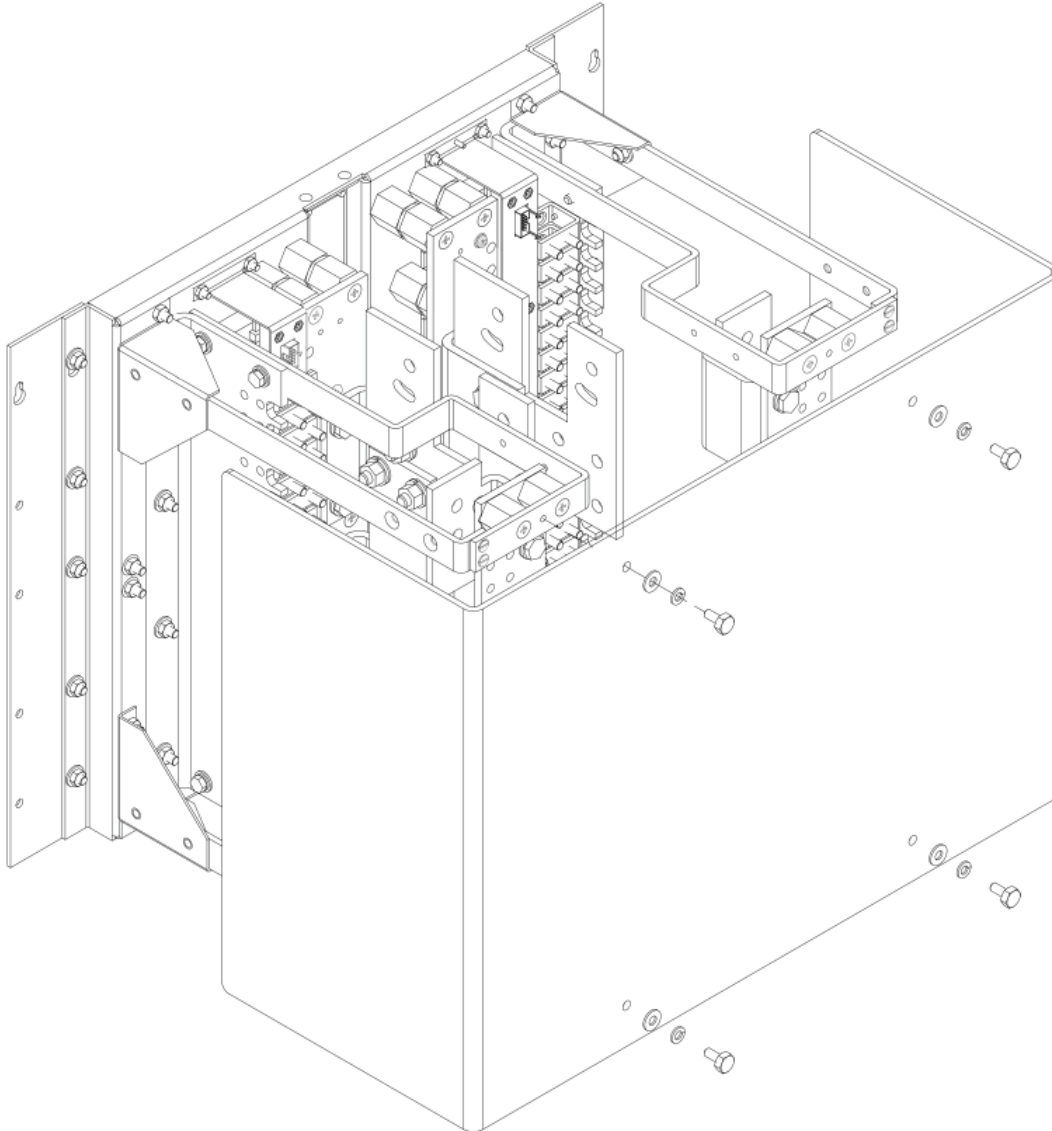


Figure 9 - Removing the Cover

2. Decide if input cables will be fed from bottom-up or top-down.
Note: Panels are shipped from the factory for top-down input cable entrance to bay. If you intend to feed input cables from the bottom-up, you must reverse the input terminal plates, as instructed in the following procedure. If necessary, to change both input buses from top-down to bottom-up input cable entrance, see Figure 10 and proceed as follows:
 - a. Remove the four, 3/8-in. hex-head cap screws securing each input bus assembly to the panel.
 - b. Rotate this assembly for input bus A and re-secure it where the bus B had been, and vice versa.
 - c. Torque the bolts to 18 ft-lb (~24 N•m)

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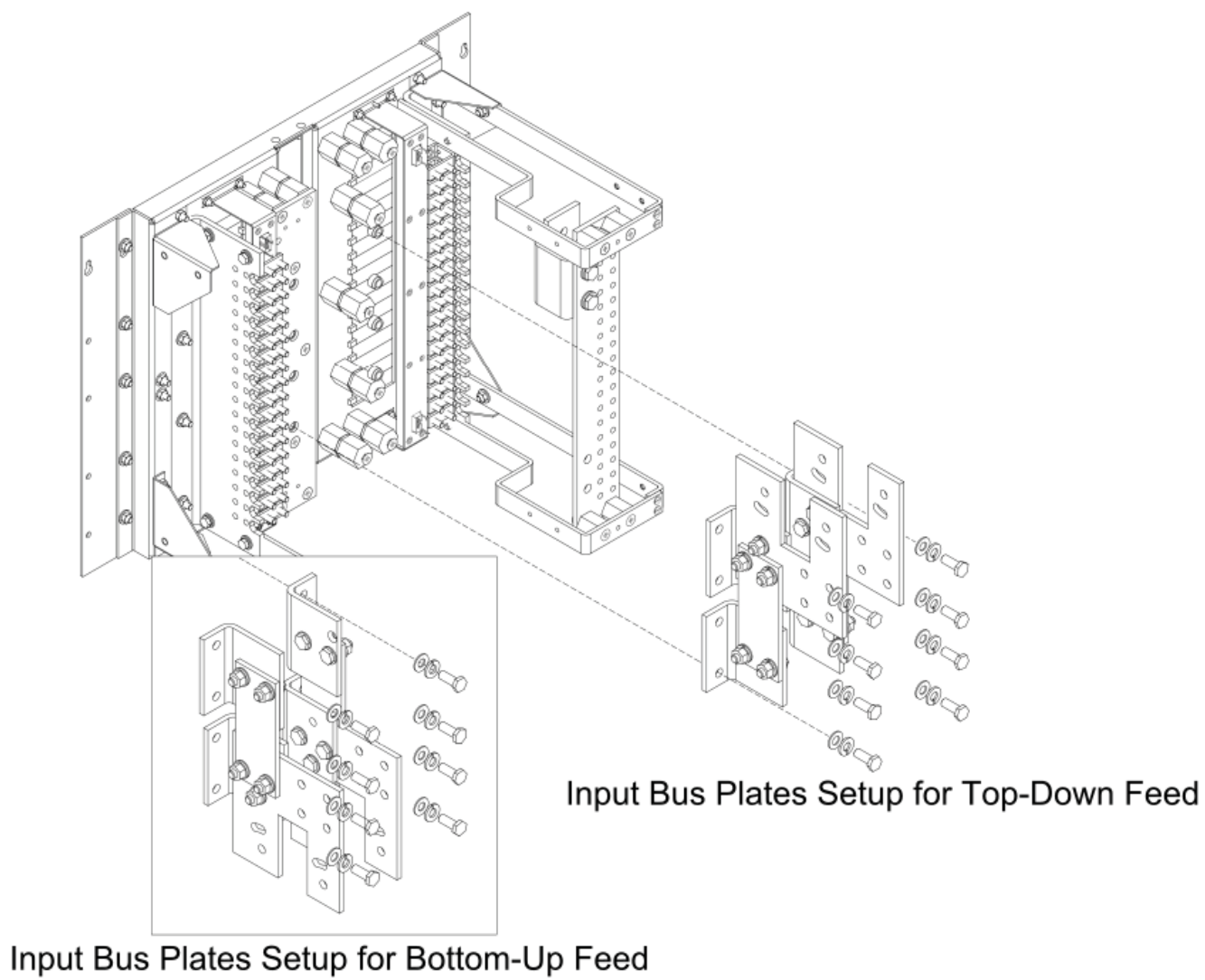


Figure 10 - Changing the Feed

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3. If the panel is to be mounted to a 19-in. rack, remove the adapter plate on each side of the panel (five, 1/4-20 KEPS nuts).

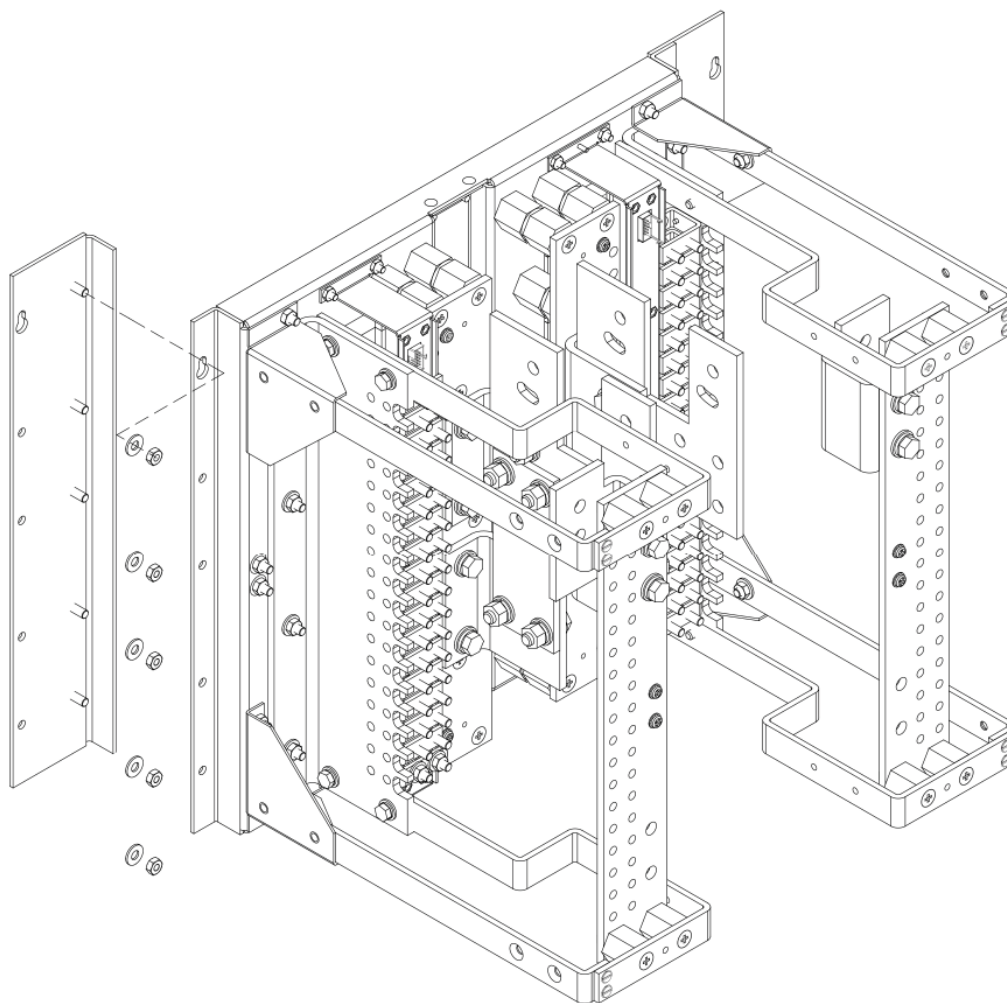


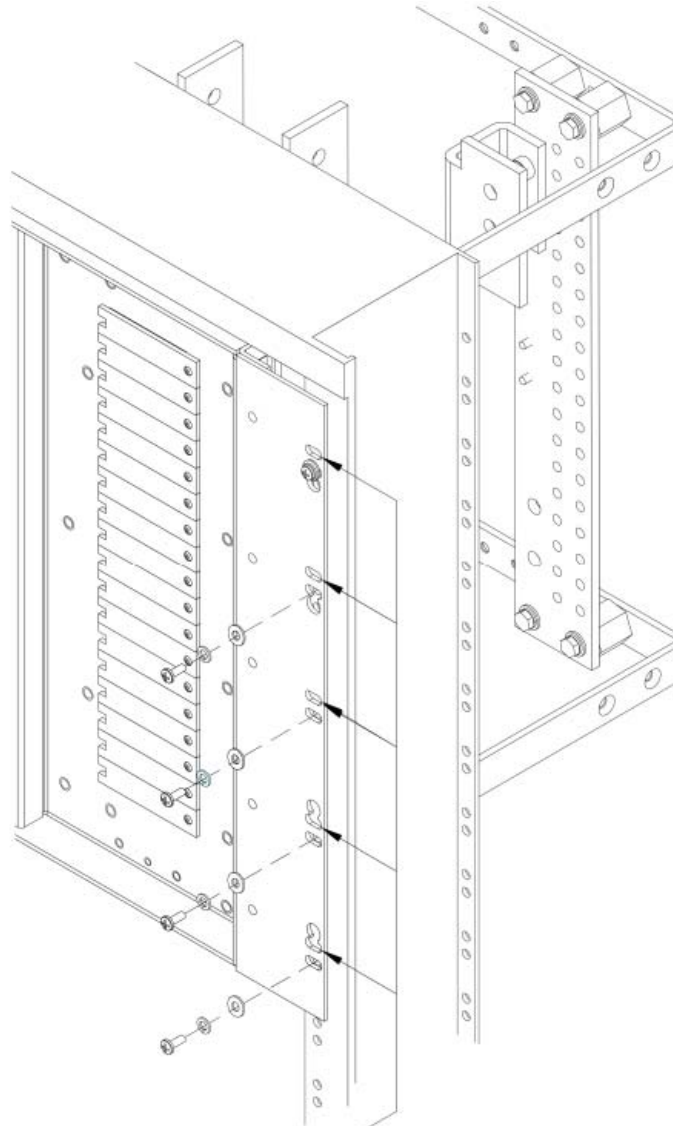
Figure 11 - Removing the Adapter Plate

4. If applicable, install optional shunts and cabling for current monitor. (See instructions included with the shunt kit.)
5. If applicable, install optional digital metering control module in place of the standard control module. (See the instructions included with the metering control module.)

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- Partially thread the two topmost fasteners (#12-20 screws, provided) for mounting the panel onto the bay.



Alternate holes are for
left flange.

Figure 12 - Threading the Fasteners

- Place the panel's keyhole mounting slots over the topmost fasteners.
- Loosely secure the mounting flange with four additional fasteners along each side.
- Torque all but the keyhole mounting fasteners to 35 in.-lb (4.29 N•m).
- Remove the keyhole fasteners installed in Step 4, and re-install along with a flat washer and a lock washer. Torque as directed in Step 9.
- Install all other panels in bay before cabling.

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2.4 Cable Installation

Use Telect's Wire Size Guide (Part Number 117995) for help in cable selection.

NOTE: Cables must conform to local operating company guidelines as well as national, regional, and local electrical codes.

Only use components and crimping tools approved by agencies or certifying bodies recognized in your country or region such as Underwriter's Laboratories (UL), TUV, etc.

Follow the prescribed order in this subsection to install and test all cabling and alarm features:

- 2.4.1 Install Ground Cabling
- 2.4.2 Install Input Cabling
- 2.4.3 Install Intrabay & Interbay Cabling
- 2.4.4 Install Alarm Cabling
- 2.4.5 Test Inputs and Alarms Without Circuit Breakers
- 2.4.6 Install Output Cabling

2.4.1 Install Ground Cabling



DANGER

DANGER! Failure to properly ground this equipment can create hazardous conditions to installation personnel and to the equipment.

A ground terminal is located near each of the panel's mounting flanges. You need to connect to one of the grounds, as shown in Figure 13.

1. Use a UL-approved crimping tool to attach a UL-approved, 2-hole compression lug onto a ground wire. Size of ground depends on input interruption device. (Refer to NEC Article 250-122 or IEEE grounding guidelines. Also, check operating company guidelines.)
2. Lightly coat anti-oxidant electrical joint compound on lug, grounding terminal, and surrounding contacting surface.
3. Then, connect the lug to the terminal using a 1/4-in. KEPS nuts and washers from the studs.

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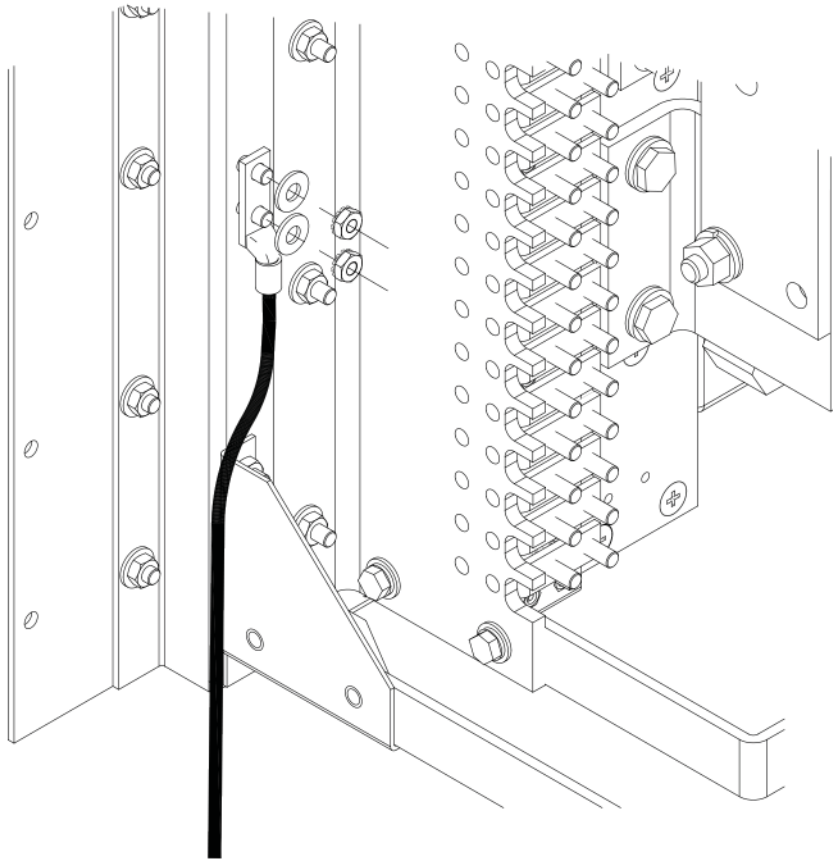


Figure 13 - Connecting the Lug

4. Torque the ground connection to 6 ft-lb (8.13 N•m).
5. Likewise, secure the connectorized opposite end of the ground cable to a bare metal portion of the bay's frame or the conductor-to-office-ground system. (If necessary, scrape paint from the frame and use electrical joint compound to ensure good ground contact.)

2.4.2 Install Input Cabling

- For top-down input feeds, begin cabling to the topmost panel and then work your way down the bay.
- For bottom-up input feeds, begin at the bottom and work your way up the bay.
- Finish all input cabling in a bay before beginning any output cabling in that same bay.

NOTES:

- Keep in mind that Feeds A and B are independent (unshared) feeds.
- Input cabling to the BDFB/BDCBB must support 125% of the total, rated, continuous load currents of the equipment powered by the BDFB/BDCBB. Remember: the maximum continuous load per feed is 600A.
- Consider inherent voltage drop in determining input wire size. Remember to choose wire size based on the circuit breaker/fuse size and not on the expected load. Use the standard formula to check wire size:

$$\text{Max. VDC Drop} = \frac{(11.1) \times (\text{fuse size}) \times (\text{total wire length in ft})}{(\text{circular mils of wire used})}$$

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Proceed as follows to cable inputs to each side of the panel:

1. Use a UL-approved crimping tool to attach a UL-approved, dual-hole 750/777.7 MCM compression lugs onto appropriate cables.
2. Insulate the lug barrels as required.
3. Clean the terminal and lugs with a non-abrasive, non-metallic pad.
4. Feed input cabling down (or up for a bottom-feed) into the rear central area of the panel - that is, between the output cable management brackets - to the topmost BDFB/BDCBB (or bottom-most for an up-feed).
5. Lightly coat anti-oxidant electrical joint compound on lugs and -48 input terminal plates.
6. Use a 3/8-16, grade 2 bolt, washers, and nut (all provided) to secure the first pair of -48 cabling to the -48 input bus terminal plate:
 - If you are using two lugs, remember to attach lugs to opposite faces of the terminal plate. **DO NOT STACK LUGS** on one side of the terminal plate.
 - Always route cables in a neat, orderly manner to ensure that the cables exert no pulling or twisting forces on the input and return terminal plates. **DO NOT ALLOW TERMINAL PLATES** to support the weight of or to restrain the cable.

NOTE: The input lugs on the top-most terminal (or bottom-most for an up-feed) are connected, as shown on the following page, so that the lugs are held straight up on the sides of the terminal plate. Subsequent cables and lugs to the in-between panels in the bay can be pivoted up to 25° off of vertical to allow easier cable management access throughout the bay.

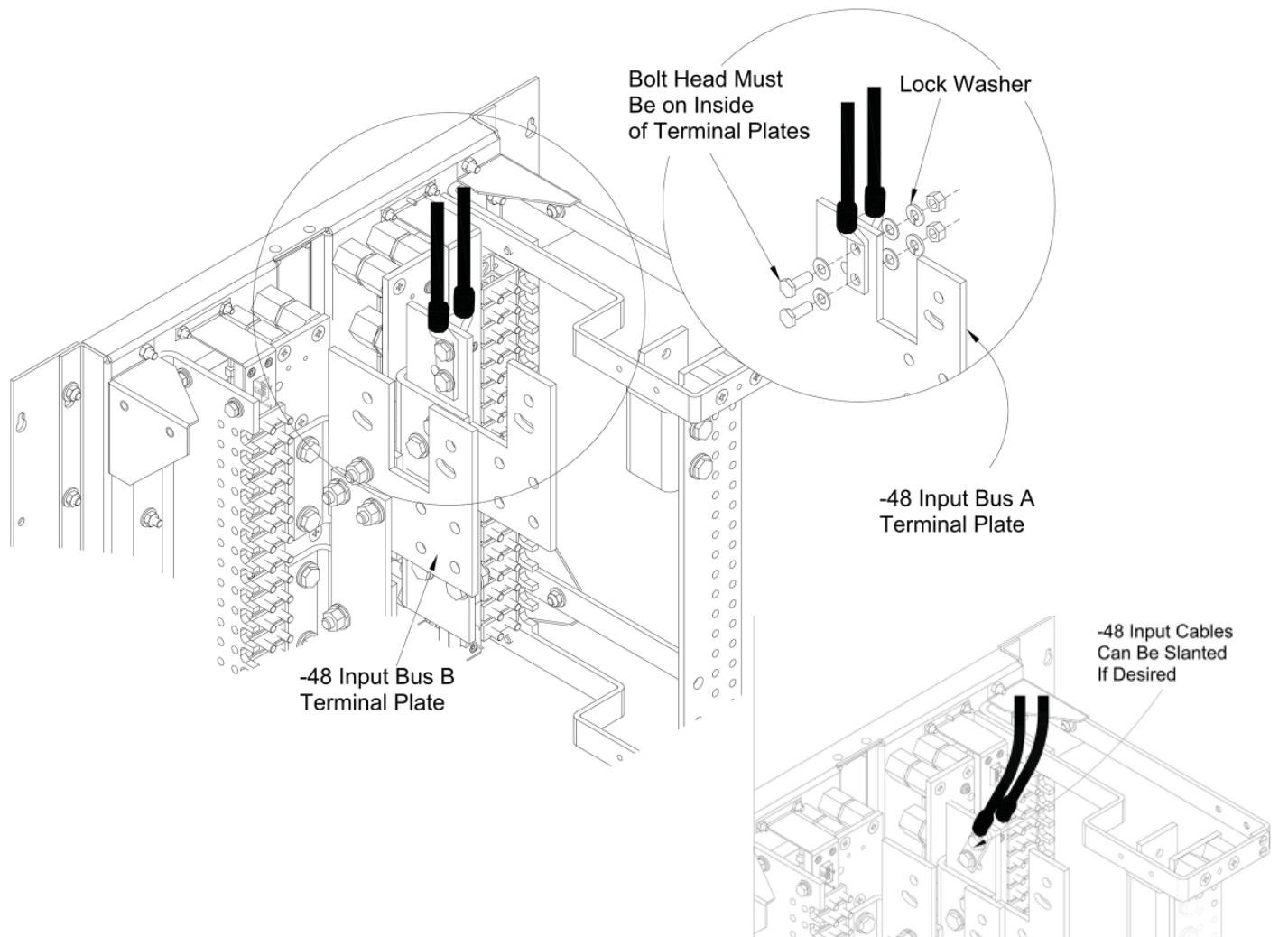


Figure 14 - Input Cables

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7. Torque input BATT connections to 36 ft-lb (48.81 N•m).

8. In similar fashion, for the input RTN:

- a. Use a UL-approved crimping tool to attach a UL-approved, dual-hole 750/777.7 MCM compression lugs onto appropriate RTN cables.
 - b. Insulate lug barrels as required.
 - c. Clean the RTN terminal plate and lugs with a non-abrasive, non-metallic pad.
 - d. Lightly coat anti-oxidant electrical joint compound on lugs and RTN input terminal plates.
 - e. Use a 3/8-16, grade 2 bolts, washers, and nuts (all provided) to secure the first pair of RTN cabling to the RTN input bus terminal plate. (See Figure 15.)
- If you are using two lugs, remember to attach the lugs to opposite faces of the terminal plate. **DO NOT STACK LUGS** on one side of the terminal plate.

Always route cables in a neat, orderly manner to ensure that the cables exert no pulling or twisting forces on the input and return terminal plates. **DO NOT ALLOW TERMINAL PLATES** to support the weight of or to restrain the cable.

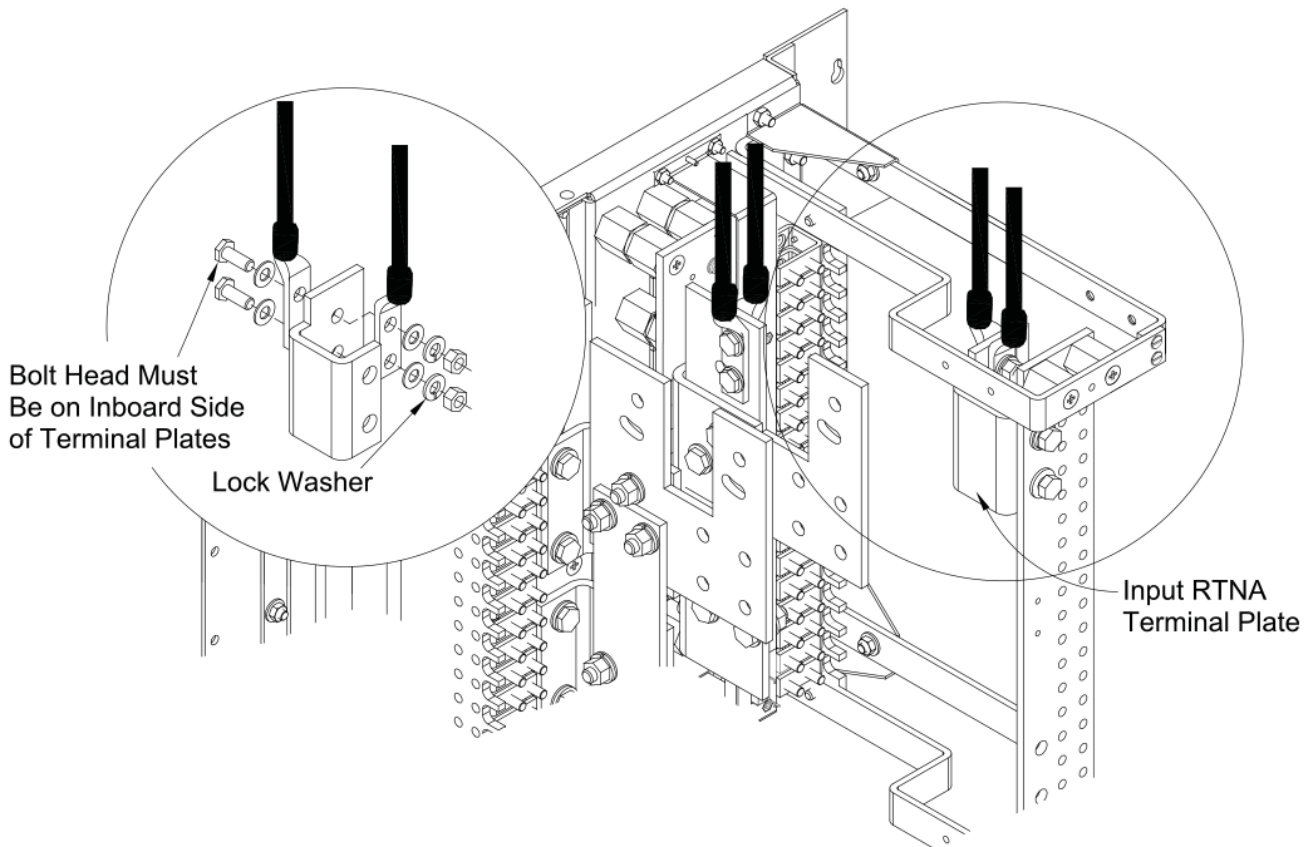


Figure 15 - Securing the Input RTN

2.4.3 Install Intrabay and Interbay Cabling

The input -48 and RTN plates contain mounting holes for bus extensions to other panels in the same bay. Telect has busing and cabling kits for all types of input extensions.

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2.4.4 Install Alarm Cabling

You can connect external indicators (monitors) to the BDFB/BDCBB alarm board. The external monitors can be wired to accept either a normally open or closed circuit when the VDC PWR or FUSE ALM LEDs or other optional alarms are activated.

To connect power- and fuse-alarm circuits to the BDFB/BDCBB, proceed as follows:

1. See Figure 16 and then remove four Phillips screws (screws with cross-recessed heads) securing the alarm panel.
2. Carefully pull off and turn the alarm panel cover around.
3. Strip off 1/4-in. of insulation on the end of a pair of 18-24 AWG alarm wires for each external alarm circuit desired.
4. Select a common (C) contact and either a normally closed (NC) or normally open (NO) contact for each alarm desired:
 - For a C and NC pair, expect continuity ($0\ \Omega$) during normal operation and an open circuit ($\infty\ \Omega$) for an alarm condition such as an open breaker or a power failure.
 - For C and NO pair, expect an open circuit ($\infty\ \Omega$) during normal operation and continuity ($0\ \Omega$) for an alarm condition such as an open breaker or a power failure.

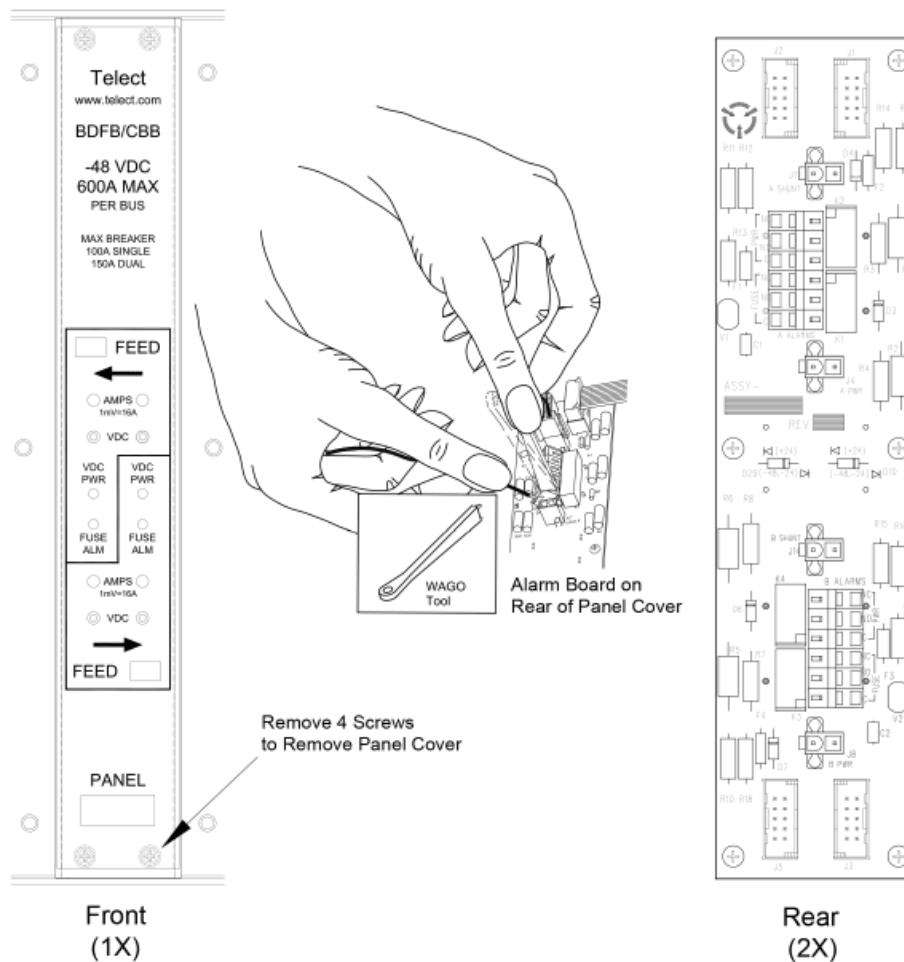


Figure 16 - Installing Alarm Cabling

5. For each contact, insert the WAGO tool (supplied) into the connector to release the contact's cage-clamp jaws. Insert the wire and then pull out tool to cinch.
6. When finished with Feed A and B alarm wiring, re-secure the alarm panel cover.

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2.4.5 Test Inputs and Alarms Without Breakers

1. Make sure BDFB/BDCBB contains no circuit breakers.
2. Turn on Feed A input power, then:
 - Verify that the VDC PWR lamp turns green.
 - Verify that the FUSE ALM lamp is not lit.
3. Use a DVM with standard .080-in. test probes to verify power and polarity at the panel's VDC test points for Feed A:
 - Connect panel RED (-48VDC) to meter RED (voltage).
 - Connect panel BLK (RTN) to meter BLK (common).
4. Use an ohmmeter at alarm monitor to verify alarm conditions. With Feed A power OK and without any installed circuit breakers, expect either continuity ($0\ \Omega$) between C and NC poles and/or an open circuit ($\infty\ \Omega$) between C and NO.
5. Repeat the procedure for Feed B.

2.4.6 Install Output Cabling

! ALERT

ALERT! Feeds A and B may be powered. Use the voltmeter to verify, and then proceed accordingly.

Remember to finish all input cabling (including all intrabay and interbay input cabling) before proceeding with output cabling in that bay.

Proceed as follows to cable panel outputs:

1. Use a UL-approved crimping tool to attach UL-approved, dual-hole compression lugs onto each pair of copper output and return cables (up to #2 AWG), as required by NEC. Insulate the lug barrels as required. The size of the cables is determined by the size of the breaker intended for that cable.
2. Clean the terminals and lugs with a non-abrasive, non-metallic pad.
3. Plan to route and restrain the cables along the outside of the cable management brackets, as shown in Figure 17.

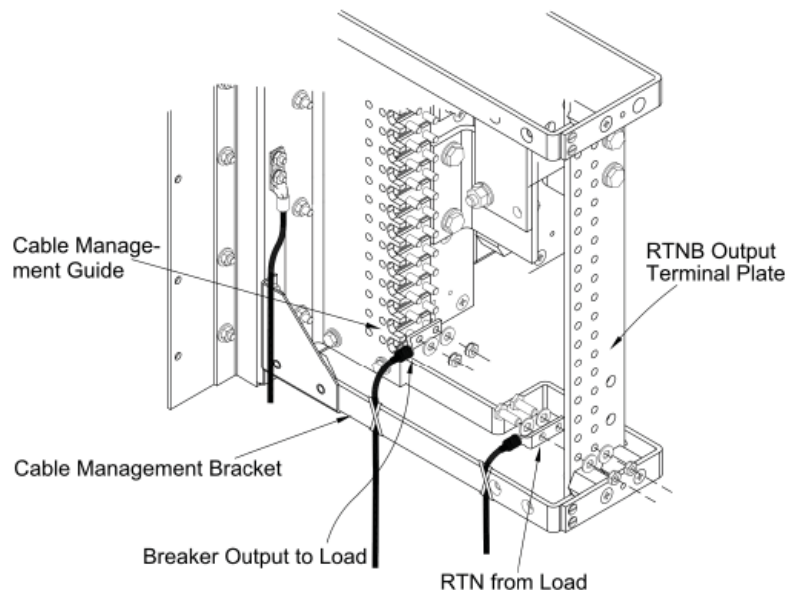


Figure 17 - Routing and Restraining Cables

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4. For a breaker output -
 - a. Remove the washers and KEPS nuts from the appropriate output studs.
 - b. Lightly coat anti-oxidant electrical joint compound on both lug and studs.
 - c. Fit the lug onto studs, secure the lug with washers and KEPS nuts, and then tighten to 6 ft-lb (8.13 N•m).
5. For an output return -
 - a. Lightly coat anti-oxidant electrical joint compound on both lug and return terminal plates.
 - b. Use 1/4-20, grade 2 bolts, washers, and KEPS nuts to secure the lug.
 - c. Tighten nuts and bolts to 6 ft-lb (8.13 N•m).
6. Arrange cables neatly. Unless directed otherwise by operating company guidelines, it is best to use lacing cord to bundle and secure cables.
7. If applicable, re-install the optional rear cover.
8. Install breakers as detailed in Section 2.5 - Circuit Breaker Installation on page 26.
9. Test the panel using the procedure in Chapter 3, Output Testing.

Dual 600A BDFB/BDCBB

Power :: 007-0001-260X

2.5 Circuit Breaker Installation



CAUTION

CAUTION! Do not install breakers with breakers switched on. Doing so may damage breakers or panel.

Local electrical and operating company guidelines recommend that the individual load not exceed 80% of circuit breaker capacity (for example, 50A breaker x .80 = 40A max. load). Total continuous load for all outputs must not exceed 600A per bus.



CAUTION

CAUTION! Use of non-approved circuit breakers may cause severe damage to the alarm panel and/or digital metering panel. **USE OF NON-APPROVED CIRCUIT BREAKERS WILL VOID WARRANTY.**

1. Remove the blank faceplate at the intended breaker position.

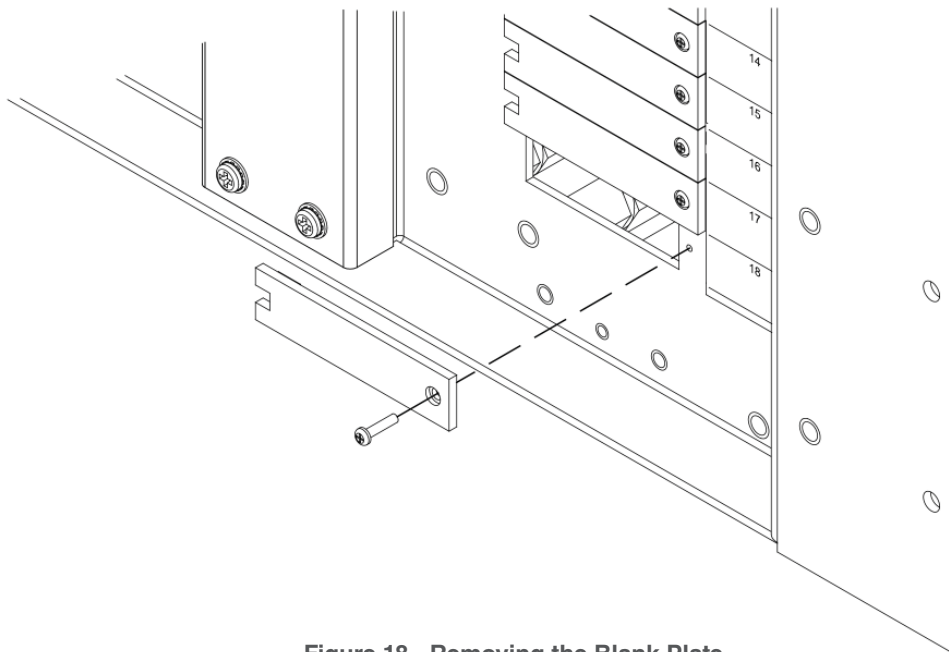


Figure 18 - Removing the Blank Plate

2. Before installing a breaker, screw the faceplate to the breaker as shown in Figure 19.

NOTE: Breakers are installed in the panel so that the OFF position is toward the outboard side of the panel. In other words, install breakers so that the LOAD side is toward the outside edge of the panel; that is, LOAD should be on the right on Side B, as shown in Figure 19, and on the left on Side A.

Dual 600A BDFB/BDCBB

Power :: 007-0001-260X

3. Make sure the breaker is off and then install it firmly into the panel. Use the screw to secure the breaker to the panel.

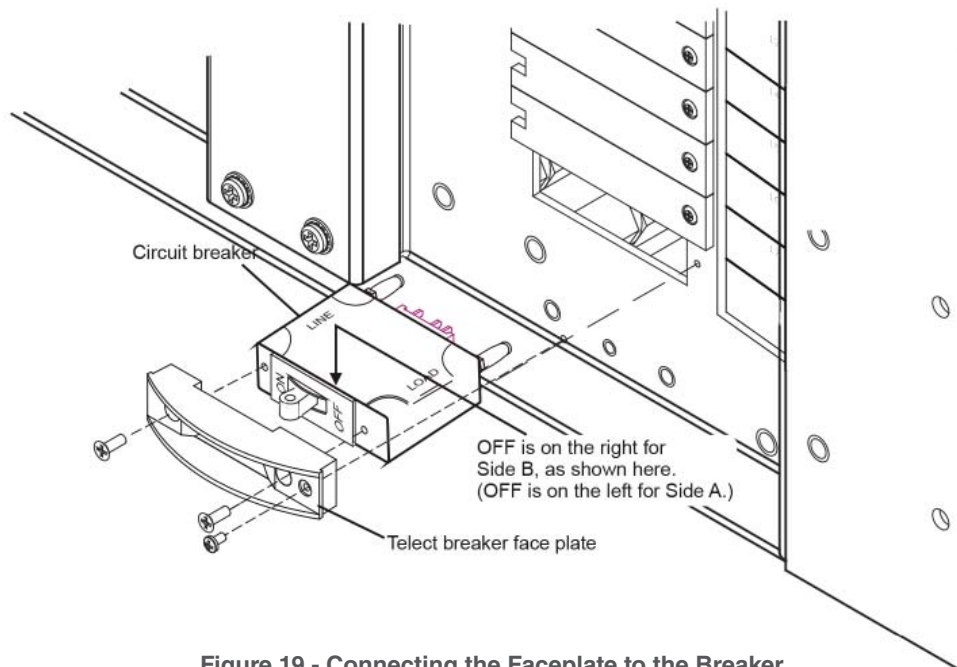


Figure 19 - Connecting the Faceplate to the Breaker

4. Label output on the designation label next to the circuit breaker.
5. Proceed to test the BDFB/BDCBB, as outlined in the next section, Output Testing, before turning on circuit breakers for the first time.

Dual 600A BDFB/BDCBB

Power :: 007-0001-260X

Chapter 3: Output Testing

! ALERT

ALERT! Only qualified personnel may install and maintain this product. Verify that all connections meet requirements specified in local electric codes or operating company guidelines before supplying power. Protect this equipment with a fuse or breaker sufficient to interrupt power levels specified in Chapter 1 of this manual.

1. For initial startup, make sure all BDFB/BDCBB circuit breakers and all inputs at output loads are disabled (disconnected or off).
2. With Feed A and B to panel turned on,
 - Verify the VDC PWR lamps turn green.
 - Verify that FUSE ALM lamps turn red.

NOTE: The FUSE ALM lamp will light if any circuit breaker on the corresponding bus is off.

3. Use a DVM with standard .080-in. test probes to verify power at the panel's VDC test points for Feed A:
 - Connect panel RED (-48VDC) to meter RED (voltage).
 - Connect panel BLD (RTN) to meter BLK (common).
4. Use an ohmmeter at the alarm monitor to verify alarm conditions for each feed.

With input feed OK, but with any circuit breaker OFF, expect the following feed conditions:

 - For the power alarm circuit, expect either continuity ($0\ \Omega$) between C and NC poles or an open circuit ($\infty\ \Omega$) between C and NO.
 - For the circuit breaker (fuse) alarm circuit, expect either an open circuit ($\infty\ \Omega$) between C and NC poles or continuity ($0\ \Omega$) between C and NO.
5. Make sure power is disabled at the first load and then turn on the corresponding BDFB/BDCBB circuit breaker.
6. Use a DVM to test power and polarity at input terminals of load.
7. Turn on the corresponding load and verify proper load operation.
8. Repeat Steps 5 through 7 for all other breakers and corresponding loads. After the last breaker is turned on, the FUSE ALM lamp must go off.
9. Use an ohmmeter at the alarm monitor to verify the powered-up circuit breaker (fuse) alarm condition.

With all circuit breakers ON and powered up, expect either continuity ($0\ \Omega$) between C and NC poles or an open circuit ($\infty\ \Omega$) between C and NO.

Note: Current readings on the digital meter panel are specified to be accurate to 0.5mV at greater than 10 mV, or within 1% at levels greater than 20% of max shunt rating. Accuracy at the test points are 0.1 mV down to 1 mV.

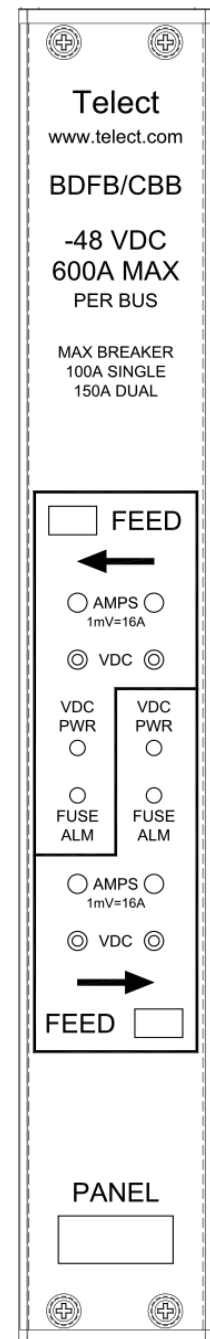


Figure 20 - Alarm Panel

Dual 600A BDFB/BDCBB

Power :: 007-0001-260X

Chapter 4: Service



CAUTION

CAUTION! Only qualified technicians may install and maintain this product.

4.1 Owner Maintenance

If you encounter technical difficulties, please use the online request form at www.telect.com under Support\Technical Support or call Telect directly at 888.821.4856.

4.2 In-Warranty Service

Contact Telect's quality call center 877.471.7245 or e-mail us at quality@telect.com. Telect will ship a new replacement product, along with a return shipping label and authorization information. When you receive your replacement product, pack up the defective product and return it to Telect using the return label, box and any additional information provided.

4.3 Out-Of-Warranty Service

Follow the In-Warranty directions above. Telect charges a processing fee for out-of-warranty service, and you must submit a Purchase Order along with a Return Material Authorization (RMA) before returning equipment. The processing fee guarantees a repair estimate and is credited against actual material and labor costs. Call Telect's quality call center at 877.471.7245 for more information.

4.4 Repacking for Shipment

1. Tag the equipment showing owner's name, address, and telephone number, together with a detailed description of the problem.
2. Use the original shipping container if possible. If you do not have it, package the equipment in a way to prevent shipping damage. Include the RMA inside the container and legibly print the RMA number on the outside of the package, near the shipping address.
3. Insure the package.

Dual 600A BDFB/BDCBB

Power :: 007-0001-260X

Chapter 5: Accessories

The following table lists optional and replacement items for the Dual 600A BDFB/BDCBB (007-0001-260X). Contact Telect for price and availability. For input and output wiring and circuit breaker selection, please refer to the Wire Sizing & Label Convention Guide (Telect Part Number 117995) included with your panel.

Item	Description	Part Number	Description	Part Number
Single-pole circuit breakers (Magnetic, 65VDC, long delay, slim line) ¹	1A	090-0052-1001	40A	090-0052-1040
	2A	090-0052-1002	50A	090-0052-1050
	3A	090-0052-1003	60A	090-0052-1060
	5A	090-0052-1005	70A	090-0052-1070
	10A	090-0052-1010	80A	090-0052-1080
	15A	090-0052-1015	90A	090-0052-1090
	20A	090-0052-1020	100A	090-0052-1100
	30A	090-0052-1030	175A double-pole ²	135921
No circuit breaker	Blank plate kit	090-0001-0020	200A double-pole ²	135922
	Face plate/cover	090-0001-0021	Double-pole adapter kit; position 17-18, 1" centers ³	007-0000-0218
			Double-pole adapter kit, position 15-16, 1" centers ³	007-0000-0216
TLS Fuses (170VDC, 100kA)	80A	140640	110A	140643
	90A	140641	125A	140644
	100A	140642		
TPS Fuses	3A	130479	25A	130476
	5A	130481	30A	130478
	6A	130483	40A	130482
	10A	130485	50A	130484
	15A	130487	60A	130486
	20A	130489	70A	130488
TFD fuse holder	For TLS/TPS fuses	129816		
Shunt kits	400A	007-0006-0400	600A	007-0006-0600
Item	Description		Part Number	
Alarm/metering panel	Standard alarm with test points		007-0003-0001	
	Dual digital display with standard alarm and test points		007-0003-0002	
ETSI bracket adapter kit	Use instead of EIA/WECO mounting brackets		007-0000-0100	
Front cover, blank	Covers 17.5-in. space in a 19-in. rack		007-0000-0102	
	Covers 17.5-in. space in a 23-in. rack		007-0000-0103	
Rear safety cover	Clear heat-resistant wrap		007-0000-0010	
Designation label	For vertical array of 18 CB positions		122845	

Dual 600A BDFB/BDCBB

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Item	Description	Part Number
Internal bus kits	Links BATT inputs buses of two BDFB/BDCBB ⁴	007-0002-0010
	Links return buses of two BDFB/BDCBB ⁴	007-0002-0020
	Expander for input battery bus ⁵	007-0002-0012
	Expander for return bus ⁵	007-0002-0022
External return bus kits	For 12 or 15-in. cable rack ⁶ : 3/4 in. c/c holes 1 in. c/c holes 1 in. & 3/4 in. c/c holes	007-0000-0115 ⁷ 007-0000-0215 ⁸ 007-0000-0315 ⁹
	For 20-in. cable rack ⁶ : 3/4 in. c/c holes 1 in. c/c holes 1 in. & 3/4 in. c/c holes	007-0000-0120 ¹⁰ 007-0000-0220 ¹¹ 007-0000-0320 ¹²
	Brackets for 1.5-in. deep cable rack ¹³	007-0000-0121
	Brackets for a 2-in. deep cable rack ¹³	007-0000-0125
	Expansion, common ¹⁴	007-0000-0122
	Expansion, insulated ¹⁴	007-0000-0123
	For 36, dual-lug load returns ¹⁵	007-0000-0225
	For 10, dual-lug load returns (spares) ¹⁵	007-0000-0231
Lug fastener kits	For 4, dual-lug, input battery or returns ¹⁶	007-0000-0230
	For 2, internal input bus expander ¹⁷	007-0000-0232
Relay racks, 7-ft. seismic	EIA with unequal flanges, white	723-0707-2130-001
	WECO with unequal flanges, white	723-0701-2130-001
	End panel, white	071-3000-0002
Enclosed cabinet	Standard zone 4 for up to four BDFB/BDCBB	Contact Telect

1. Contact Telect for alternate circuit breakers, such as mid-trip or short delay. SEE CAUTION THAT FOLLOWS.
2. Two face plate kits should also be ordered when using double-pole breakers.
3. The double-pole adapter kit bridges adjacent single-pole CB slots for use with double-pole breakers.
4. Each expansion kit contains parts and fasteners to link adjacent (above/below) BDFB/BDCBBs in a rack. Three kits are required to link a maximum of four, 10RU BDFB/BDCBBs per rack.
5. Bracket and fasteners used to expand from four 750/777.7 MCM input positions to six to accommodate up to four multiple 600A BDFB/BDCBBs in a 2400A rack.
6. Each kit contains parts and fasteners to install an overhead return bus to the plant's 12-in., 15-in., or 20-in. wide ladder rack system. Each copper plate handles multiple dual-lug connections for a total 600A continuous load at 800A max. load. Each return bus accommodates dual lugs with 3/4-in. and/or 1-in. center-to-center (c/c) hole spacings. Brackets for 1.5-in. versus 2-in. deep cable racks are ordered separately.
7. 32 sets of dual holes. Lugs can be bolted to both sides for a total of 64 lug connections.
8. 16 sets of dual lugs. Lugs can be bolted to both sides for a total of 32 lug connections.

9. 12 sets of dual holes with 1-in. center spacing; 22 sets of dual holes with 3/4-in. center spacing. (Not all hole sets can be used when accommodating both types of lugs.) Lugs can be bolted to both sides.
10. 38 sets of dual holes. Lugs can be bolted to both sides for a total of 76 lug connections.
11. 20 sets of dual holes. Lugs can be bolted to both sides for a total of 40 lug connections.
12. 16 sets of dual holes with 1-in. center spacing; 20 sets of dual holes with 3/4-in. center spacing. (Not all hole sets can be used when accommodating both types of lugs.) Lugs can be bolted to both sides.
13. Pair of brackets plus fasteners accommodate either 12-in., 15-in., or 20-in. wide ladder racks.
14. Allows for additional external return buses; either electrically interconnected or isolated. Requires a lug fastener kit, ordered separately.
15. Set includes 1/4-20 bolts, washers, and nuts for each connection.
16. Set includes 3/8-16 bolts, washers, and nuts for each connection.
17. Set includes 3/8-16 bolts, washers, and nuts.



CAUTION

CAUTION! Use of non-approved circuit breakers may cause severe damage to the alarm panel and/or digital metering panel. USE OF NON-APPROVED CIRCUIT BREAKERS WILL VOID WARRANTY.

Dual 600A BDFB/BDCBB

Power :: 007-0001-260X

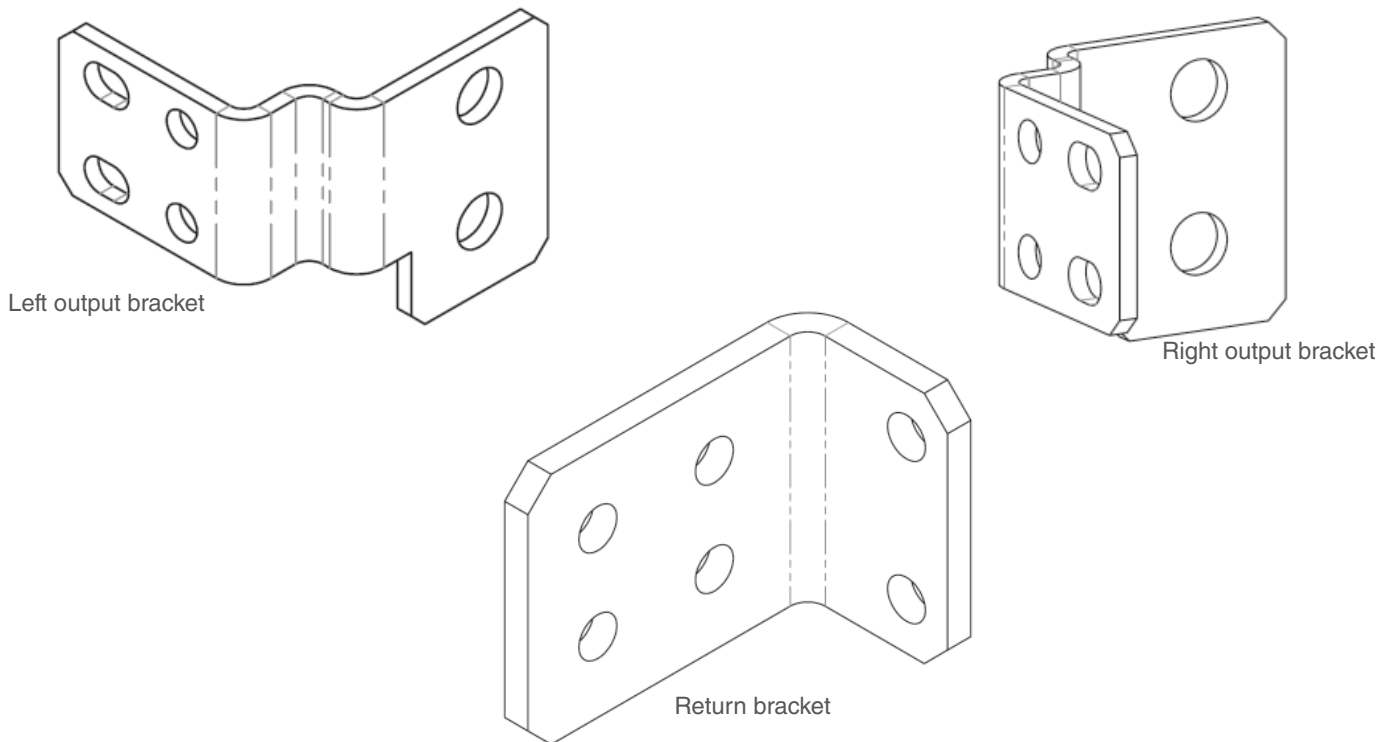
Chapter 6: Installing Optional Double-pole Adapter Kit

Each double-pole adapter kit comes with two adapter brackets for the circuit breaker output terminals and the necessary hardware to mount the brackets and cabling. The 007-0000-0218 also includes two brackets for the returns which will provide return connectivity for both the 007-0000-0218 and 007-0000-0216.

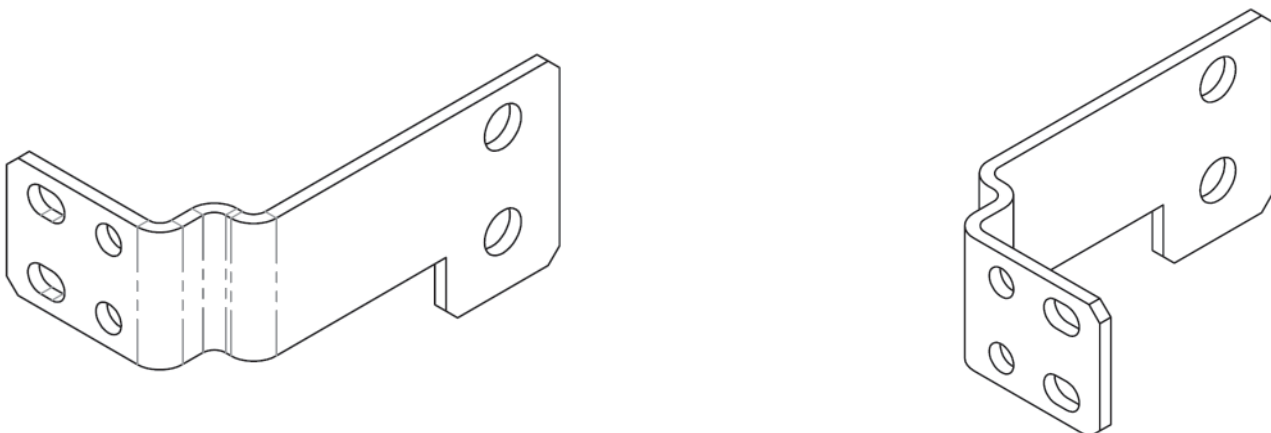
The 007-0000-0218 was designed to fit at the lowest circuit breaker position, position 17-18.

The 007-0000-0216 was designed to fit at circuit breaker position 15-16 (the brackets are slightly longer to allow for easier cable management). When using the 007-0000-0216 the 007-0000-0218 is required for the necessary brackets for the returns.

007-0000-0218 Adapter kit brackets

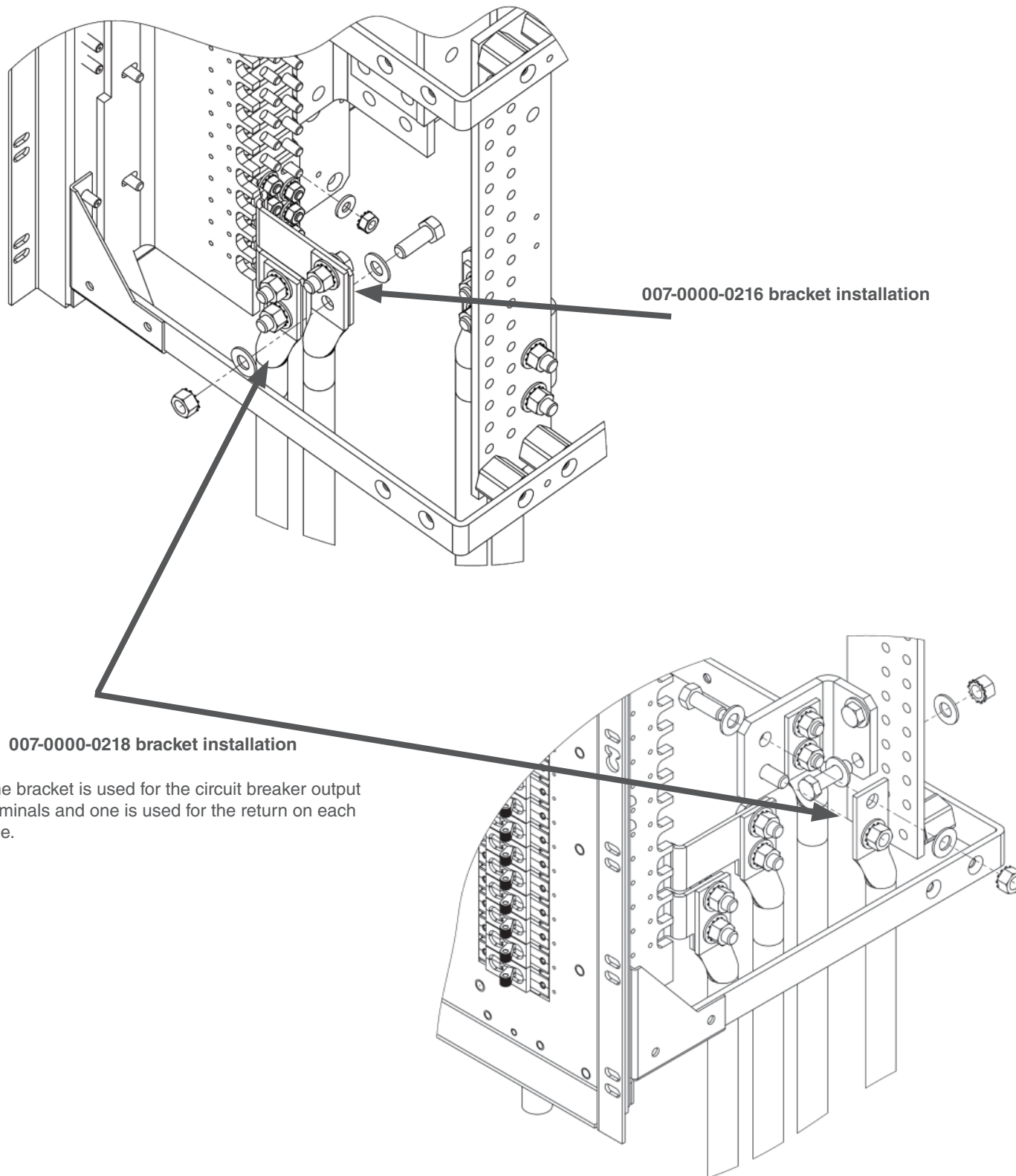


007-0000-0216 Adapter kit brackets



Dual 600A BDFB/BDCBB

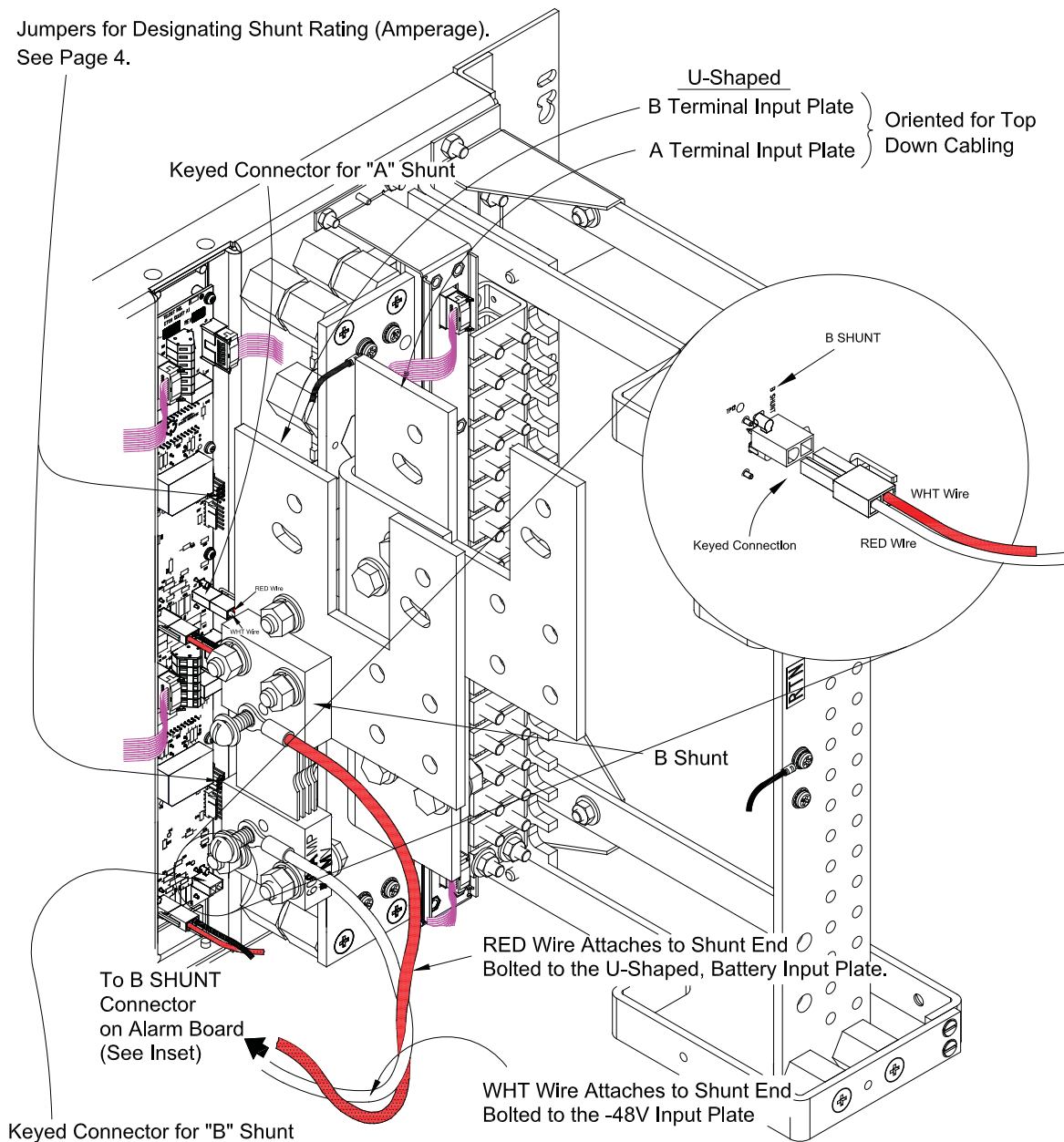
Power :: 007-0001-260X



Dual 600A BDFB/BDCBB

Power :: 007-0001-260X

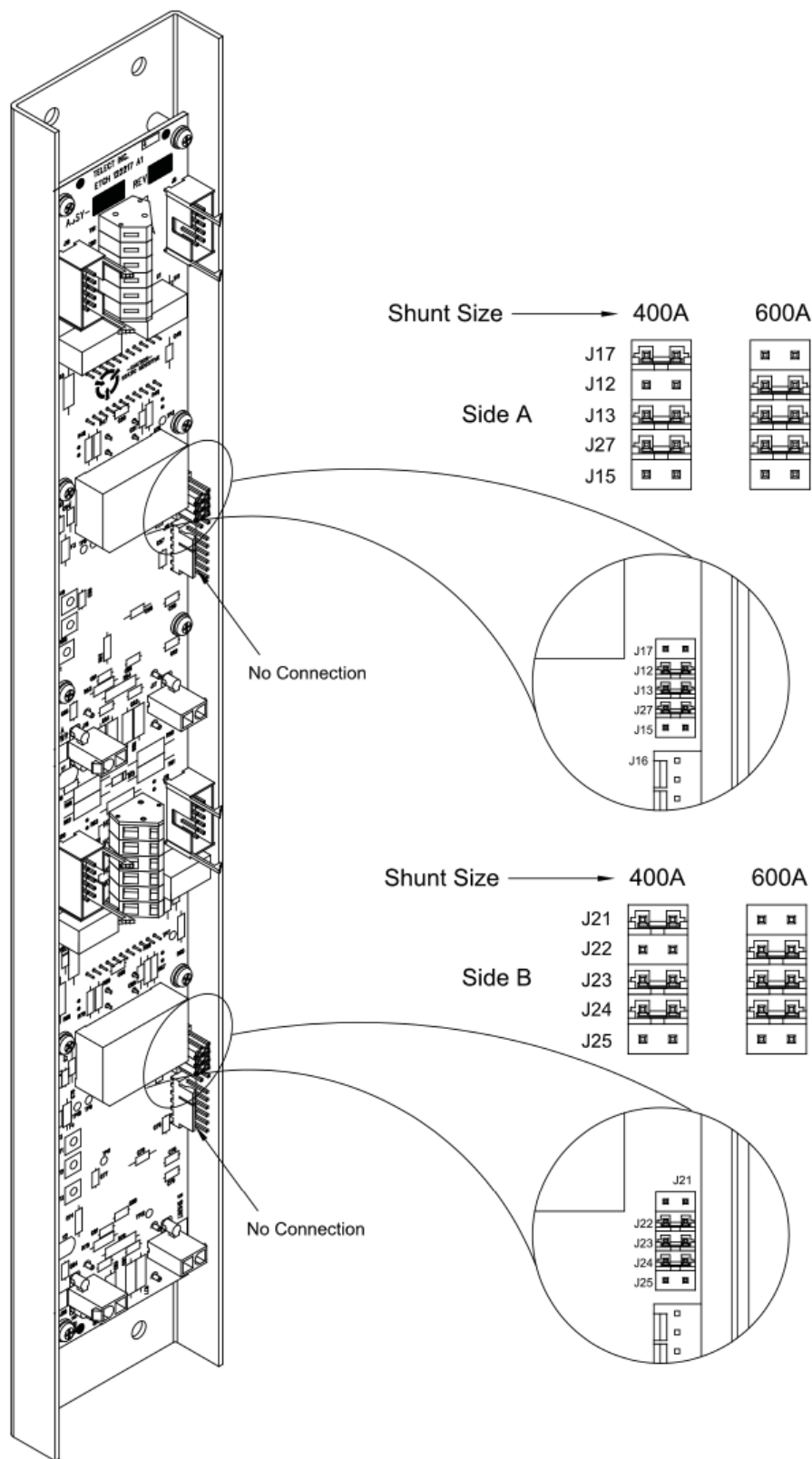
Chapter 7: BDFB/BDCBB Shunt/Metering Information



Electrical Connections Between Shunt &
Alarm Board on Rear of Digital Metering Panel Cover

Dual 600A BDFB/BDCBB

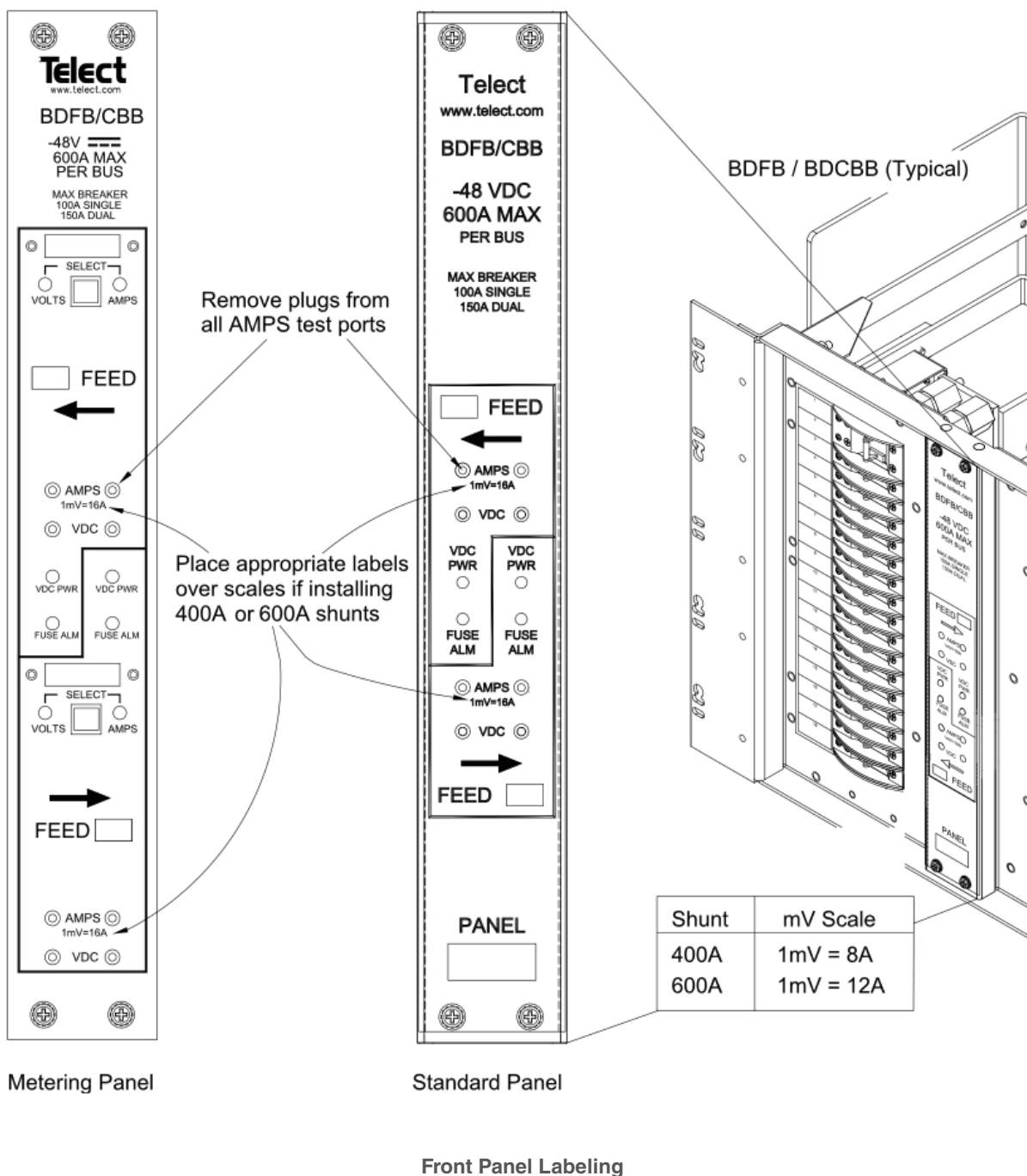
Power :: 007-0001-260X



Jumper Settings for Shunt Size on Digital Metering Panel

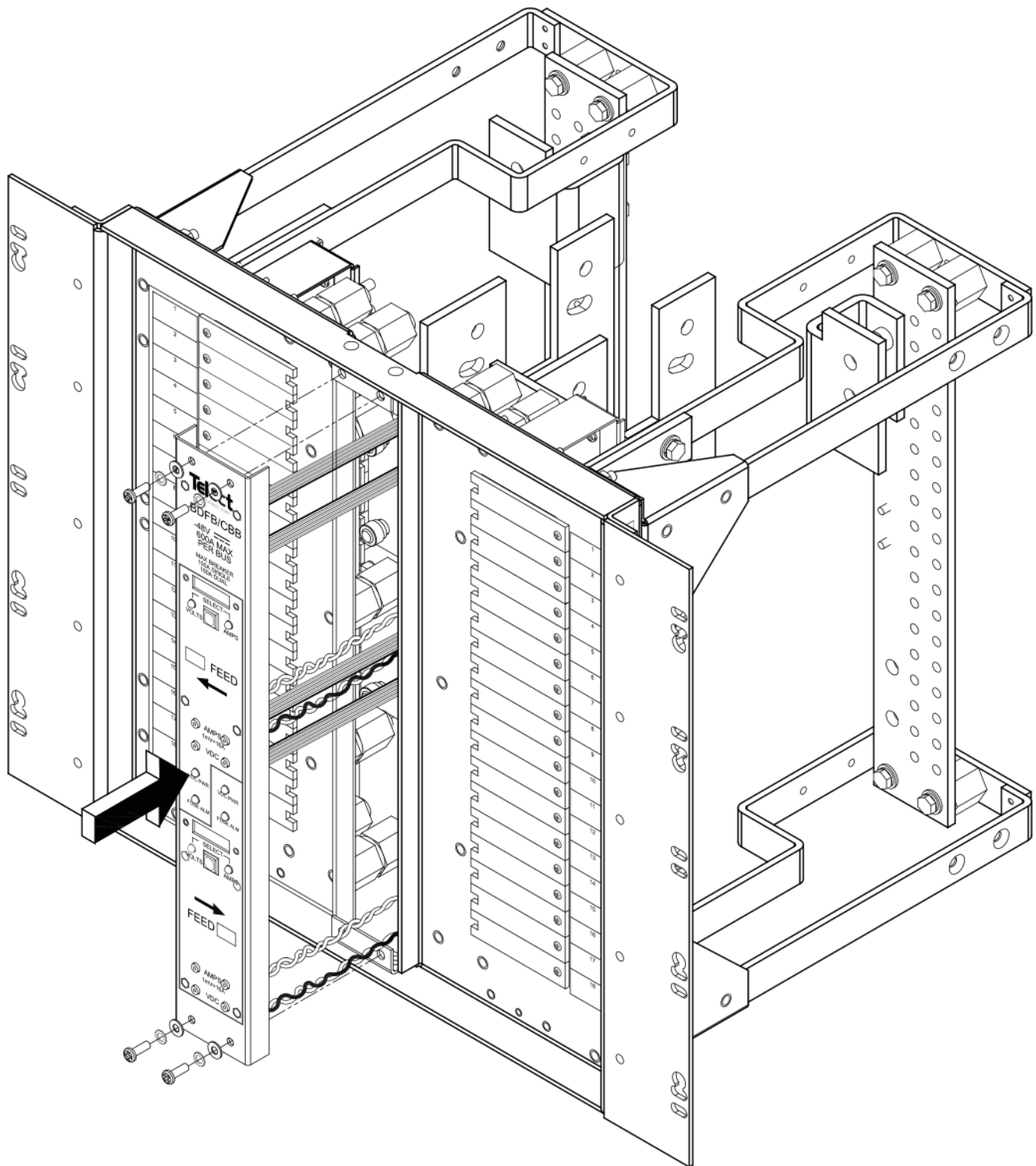
Dual 600A BDFB/BDCBB

Power :: 007-0001-260X



Dual 600A BDFB/BDCBB

Power :: 007-0001-260X



Installing/Removing Metering Panel

Dual 600A BDFB/BDCBB

Power :: 007-0001-260X

Chapter 8: BDFB/BDCBB Digital Metering Panel Installation Instructions

1. Shunts should already be installed.
If not, see BDFB/BDCBB Shunt Kit Installation Instructions (Telect Part Number 124393).

! ALERT

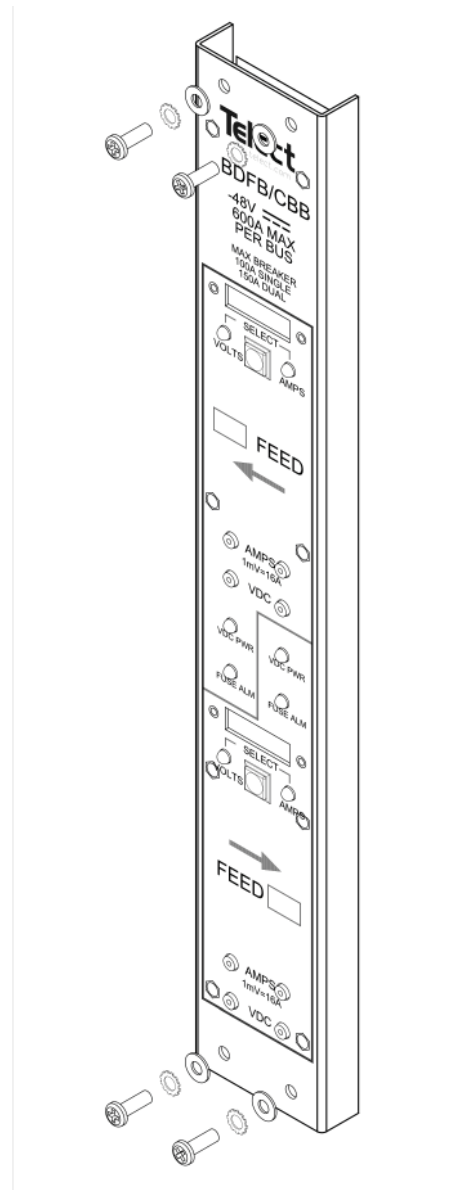
ALERT! The standard panel can be replaced with the metering panel while power is on. If the BDFB/BDCBB is powered up, take care to prevent loose wires and cables from falling into the interior of the BDFB/BDCBB. Objects that fall into the interior can cause damage and/or breakers/fuses to trip/blow. Use no metallic tools within the BDFB/BDCBB while power is on.

2. Detach standard panel (four sets of screws and washers) from BDFB/BDCBB. Discard screws and washers.
3. Disconnect six connectors (four circuit breaker ribbon cables and two twisted pairs of power cables) from board on rear of standard panel. If applicable, also disconnect optional alarm wires, as shown in the inset on the next page.
If shunts are installed, also disconnect two additional connectors on the two twisted pairs from the shunts.
4. On the rear of the digital metering panel, preset the jumpers on the alarm board to match the amperage of the installed shunts (refer to Figure on page 38).

In other words, before cabling and installing the metering panel, you must configure the jumpers to match the current capacity of the shunts installed in the BDFB/BDCBB.

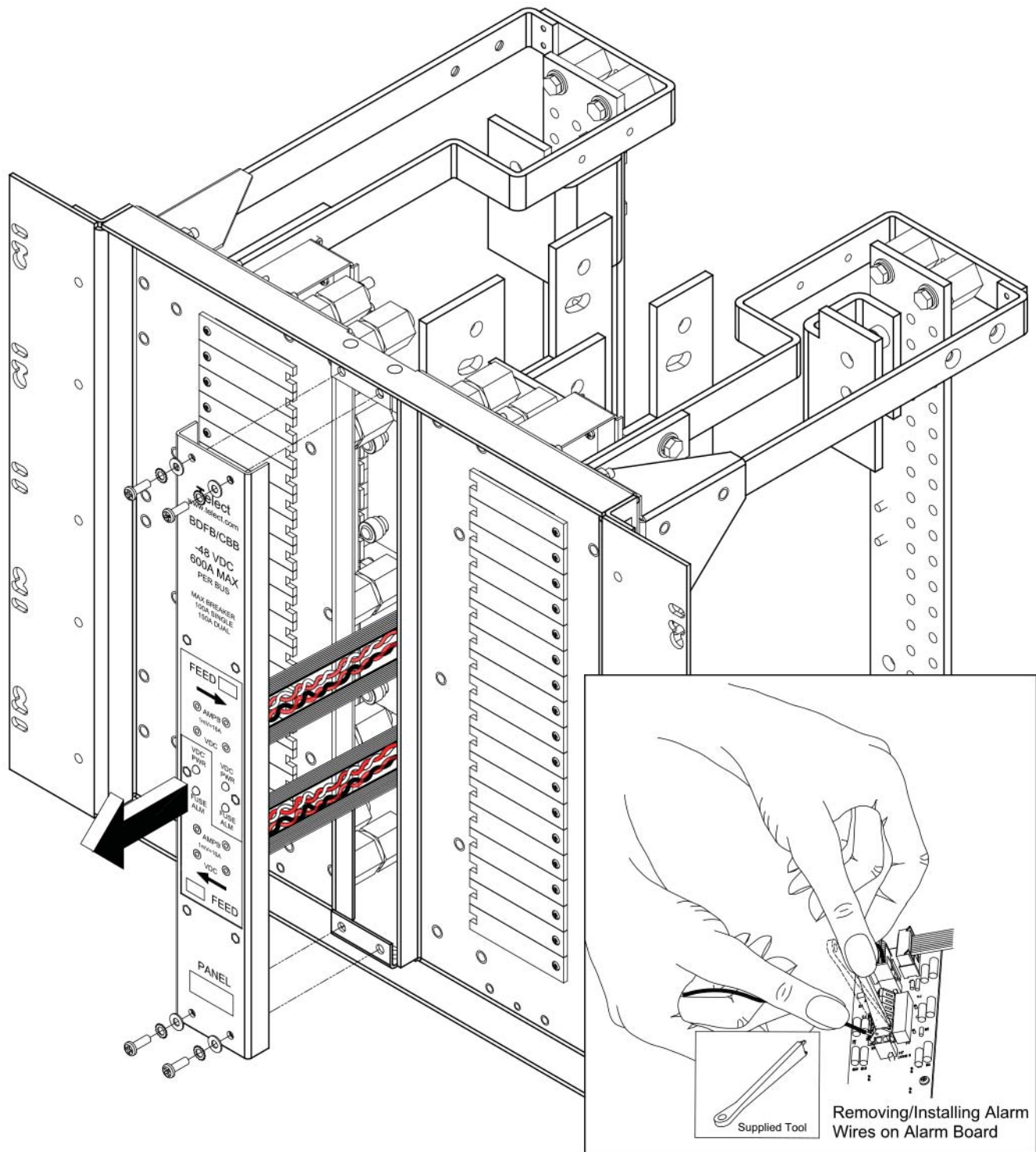
This ensures that the digital readouts will be calibrated to the installed shunts.

Note: Current readings on the digital meter panel are specified to be accurate to 0.5mV at greater than 10 mV, or within 1% at levels greater than 20% of max shunt rating. Accuracy at the test points are 0.1 mV down to 1 mV.



Dual 600A BDFB/BDCBB

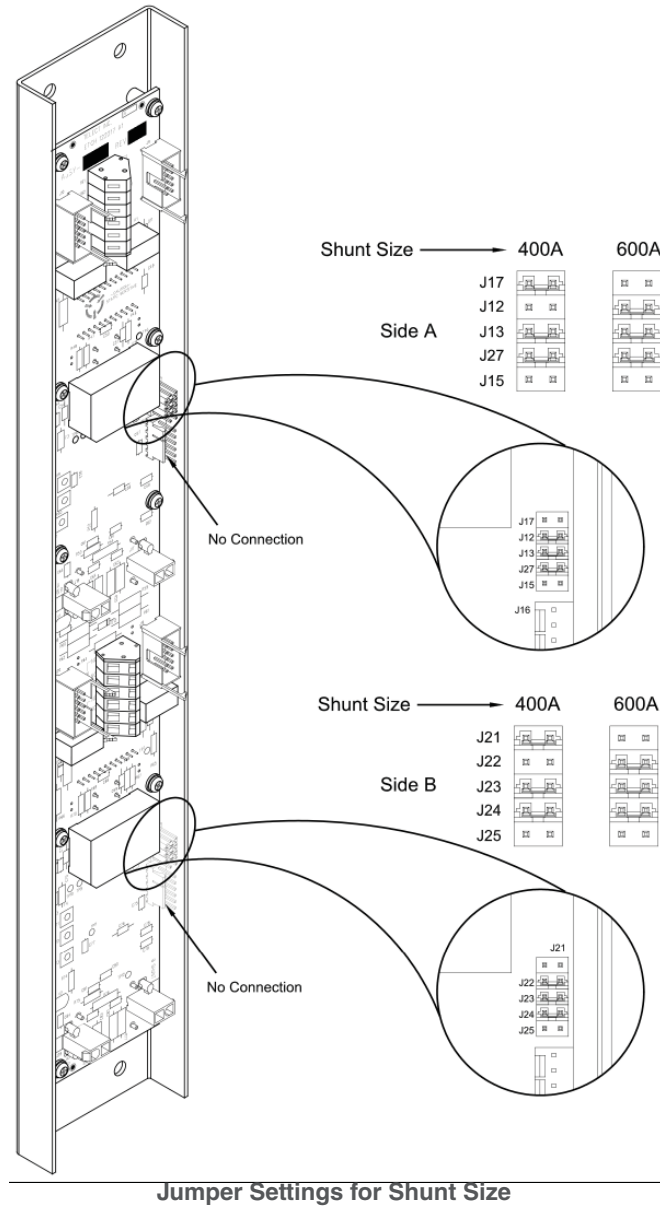
Power :: 007-0001-260X



Removing Standard Panel (With Shunt Previously Installed)

Dual 600A BDFB/BDCBB

Power :: 007-0001-260X



5. Connect twisted pairs, ribbon cables, and alarm wires to alarm board on metering panel, as shown on page 39.

NOTE: When installing connectors, make sure you connect the A input bus to the "A PWR" connector on the alarm board, B input bus to "B PWR," shunt A to the "A SHUNT" and shunt B to "B SHUNT." DO NOT CROSS-CONNECT SHUNTS AND POWER on the alarm board (see Caution in illustration on page 39).

6. Double-check connections to alarm board.

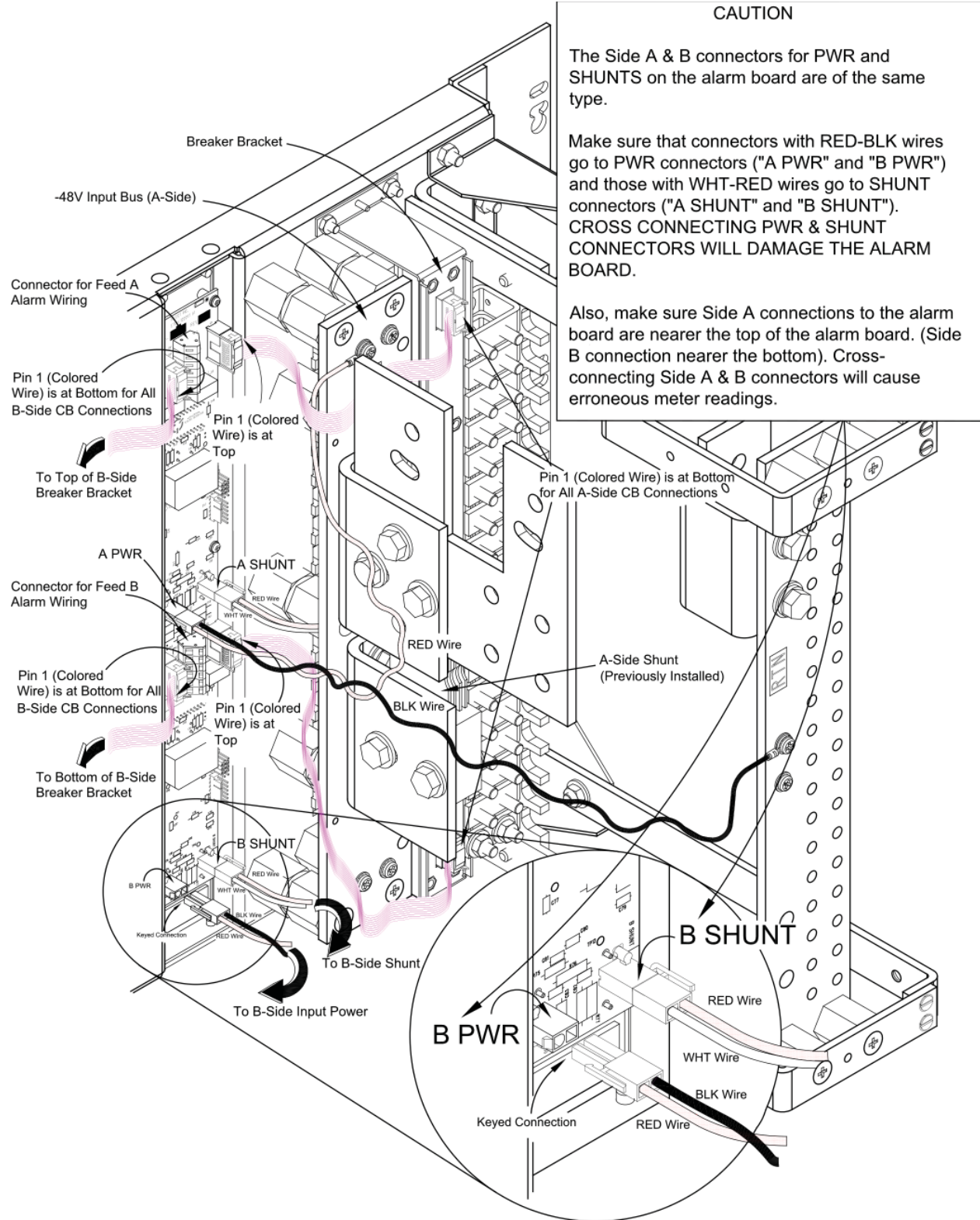
7. Secure meter panel to BDFB/BDCBB using screws and washers provided with metering panel (see page 35).

To operate metering panel -

- Press SELECT to toggle between AMPS and VOLTS on the display. LED next to switch will light to indicate Amperes vs Volts.
- Use standard .080-in. meter probes at panel test points. Connect RED test point (-48 VDC) to meter RED (voltage) and BLK test point (RTN) to meter BLK (common). For amperage, multiply meter reading by value below AMPS test points on the panel: each mV on meter represents 8A or 12A depending on rated value of the shunt (400A or 600A, respectively).

Dual 600A BDFB/BDCBB

Power :: 007-0001-260X



Electrical Interconnections Between Metering Panel,
Power, Circuit Breakers & Shunts

Dual 600A BDFB/BDCBB

Power :: 007-0001-260X

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